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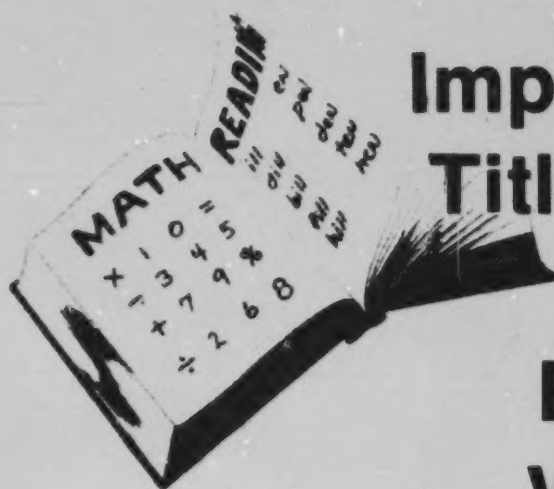
ABSTRACT

A statistical view was compiled of the impact of Elementary and Secondary Education Act (ESEA) Title I programs on student achievement in 45 of the 55 West Virginia county school districts between 1977-78. The RMC Model A-1 design was used by each district. Nationally normed achievement tests were administered for pretesting and posttesting of the treatment group. The report contains descriptions of: (1) the national effort to develop a system for aggregating outcome data from diverse programs; (2) the state effort to implement the RMC Model A-1 evaluation model; (3) the state's implementation process; and (4) Title I program outcomes presented in terms of the normal curve equivalent (NCE). Title I participant achievement is presented as the change in mean gain scores in NCEs. Mean gain scores are reported by the following variables: subject, grade, time spent in the program, method of presentation, and dates of the pretest and posttest. Additionally, data are provided on the number of participating students, the number of tested students, and the cost of the program. (Author/MH)

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Impact Of ESEA Title I Programs On Education In West Virginia

Final Report

Fiscal Year 1977-78

West Virginia Department of Education

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Final Report

Fiscal Year 1977-78

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PREFACE

This report is made in compliance with a mandate of the U.S. Congress as set forth in the Education Amendments of 1974 (PL 93-380). As a result of the mandate, the Commissioner of the United States Office of Education (USOE) provided the states with models appropriate for the evaluation of diverse Elementary and Secondary Education Act (ESEA), Title I programs. And, states were to utilize one or more models to report to USOE the impact of their Title I programs.

West Virginia selected and used the norm-referenced model as the basic method of collecting the Title I data. The implementation of this model for the purpose of ultimately producing a statewide impact report resulted in the development of a totally new system. This system was inclusive of data collection procedures, data analysis, data interpretation, and report writing.

Since the model required a new system, the talents and efforts of many groups were needed. Those groups providing most of the planning and implementing were: (1) The state Title I staff, (2) the Technical Assistance Center personnel, and (3) the Division of Research and Evaluation personnel in the Bureau of Planning, Research and Evaluation.

For the data and information necessary to write this report, I am indebted to the ESEA Title I personnel at all levels which includes teachers, LEA directors, regional personnel and State staff.

Philip F. Thornton
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I. INTRODUCTION

The avowed purpose of the annual West Virginia Elementary and Secondary Education Act (ESEA), Title I, evaluation report has always been one of ascertaining program impact upon student participants. This purpose has not been easy to fulfill due to necessary diversity in programs designed to meet the needs of eligible students. How to aggregate data was a problem and remains a problem.

A NATIONAL EFFORT

The question of how to aggregate project data was not unique to West Virginia, and Congress in the Education Amendments of 1974 (PL 93-380) directed the Commissioner of the United States Office of Education (USOE) to provide state education agencies with models for evaluation of the diverse programs. Such models must include uniform procedures and criteria usable by both local and state education agencies. Further, the commissioner was directed to provide technical assistance to the state agencies which would enable them to assist the local education agencies implement the evaluation models. And, as a final requirement, the commissioner was required to provide techniques and methodology which would yield summative data. Thus, in-state, state-to-state, and nationwide summations of Title I program results could be made.

To fulfill the congressional mandate, the United States Office of Education contracted with RMC Research Corporation (RMC), Mountain View,

California, to fulfill a part of the requirement. As a result, RMC in 1976 had completed development of a prototype Title I evaluation and reporting system which was disseminated to key Title I and evaluation personnel from each state in regional workshops which were held in late 1976.

The evaluation and reporting system was developed after interviewing policy makers in USOE, Department of Health, Education and Welfare (HEW), and Congress which revealed an interest in knowing the impact of Title I on students served. This was followed by an extensive review of past Title I evaluation reports. The one area of reporting which was discovered to have the least common standardization from state-to-state was program impact.

Since common standardization was necessary for the commissioner to meet the Congressional mandate of 1974, RMC sought to provide a viable model with three basic options, each with a common metric. These options (described in Appendix A) were identified as Model A (Norm-Referenced), Model B (Control Group), and Model C (Special Regression).

Each model was designed for use with local and/or state selected evaluation designs and test instruments. And, each model was designed to determine student difference as a result of student participation in a Title I program. And, regardless of model, evaluation design, and test used, gains were expressed in a common metric, Normal Curve Equivalent (NCE). The NCE is a normalized standard score which was linearly transformed to match the percentile distributions at values of 1, 50, and 99. This provides a mean of 50 and a standard deviation of 21.06. NCEs have an equal-interval scale which legitimizes their use in the arithmetic operations of addition, subtraction, multiplication, and division.

A special field-test of the models was conducted in selected

states in 1977. The results of such testing was reported to state Title I personnel. This information was supplemented by special assistance provided by Technical Assistance Centers (TACs) funded by USOE to serve states within each HEW region of the country. The TAC serving West Virginia is located in Durham, North Carolina. The TAC contractor is NTS Research Corporation (NTS).

THE STATE EFFORT

Key Title I personnel and evaluators from throughout West Virginia were introduced to the RMC Research Corporation developed models for evaluation at a Technical Assistance Center conducted workshop held in Morgantown, West Virginia, March 24, 1977. This workshop was followed by meetings for key local education agency (LEA) personnel from all counties within West Virginia. These were held at various locations throughout the state for the convenience of participants. Again, NTS personnel with the assistance of state Title I staff conducted the workshops.

An integral part of the workshop plan was to build the LEA personnel's familiarity with models and increase their confidence and ability to implement the processes leading to fully instituting one or more of the models. At the strong urging of state Title I staff many did attempt the implementation of one of the RMC developed evaluation models during school year 1977-78.

Although not mandatory, 45 of the 55 LEAs implemented the new processes for evaluation. The other ten counties used evaluation processes previously developed by West Virginia Title I staff. Each one of the 45 counties used Model A. Model A utilized a standardized test;

that is, it is a norm-referenced model. Change in performance (gain) which is attributable to student participation is determined by measuring the change in percentile rank from pretest to posttest. For purposes of aggregation percentiles are converted to NCEs.

Since the primary reason for collection of Title I data in West Virginia was to improve programs in-state, student change data was collected by presentation procedure (see page 15 for explanation), time spent per day in the program, number of days per week in the program, and cost of the program. This was in addition to required data dealing with subject and grade level.

LIMITATIONS OF THE REPORT

A congressional mandate in 1974 which directed the commissioner of the USOE to provide Title I evaluation models to state education agencies resulted in a series of actions. To fulfill its obligations the USOE contracted with RMC Research Corporation to develop the required models and with various research groups across the country to provide technical assistance to the states. In West Virginia, Technical Assistance Center personnel assisted both Title I state staff and LEA personnel to implement the models. But in spite of all the independent and combined efforts and good intent, the following data and the interpretive report must be read and viewed with certain limiting conditions in mind. The following list of conditions and situations is not inclusive, but will serve to remind the reader to pause and reflect upon the full meaning of that which is reported hereafter.

1. This was a first year effort to evaluate with a completely new system (a field trial).
2. The terms and format of reporting data were new to most

personnel.

3. The nature of the reporting system requires aggregation of data from school, from the LEA and from the state. This compounds and confounds any mistakes.
4. The tests were in some cases not compatible with the model.
5. In some cases the test dates were at variance with those appropriate to the stated norms.
6. The evaluation model was not intended for use with first grade students.
7. Many students were unable to take a pretest and posttest. Thus, the number in the tested groups was fewer than the number in the participation groups.
8. Some subgroups reported on are large while some are small. This has a direct bearing on interpretation.
9. Cost data was collected only for math and reading by program presentation. Cost data was not collected by grade, by time, by test dates, or by combined subject areas; e.g., math and reading.

ORGANIZATION OF THE REMAINDER OF THE REPORT

Following the Introduction, the report was divided into three additional sections. Each section was written in a manner designed to improve the reader's understanding of all other sections.

Section II reviewed those processes which were important to the final interpretation of Title I's impact on student recipients. These included instrument development, collection methods, and data analysis procedures.

Section III presented the outcomes from the analysis of state-wide student changes which were attributed to the Title I program.

The intent of the final section, Section IV, was to clarify the Title I outcomes through a summarization; provide concluding statements

with expected implications for the program; and draft recommendations which may be useful for improved planning for the future.

II. PROCESSES

In order to understand fully the impact of Title I on participating students, it is necessary that the processes leading to the final document be presented. Therefore, the information which follows is included to improve the reader's ability to read interpretatively the final two sections, Section III and Section IV.

DATA COLLECTION INSTRUMENT

The data collection instrument was adapted from an instrument developed by RMC Research Corporation, Mountain View, California, under contract with the Office of Education, U. S. Department of Health, Education and Welfare. The instrument was titled ESEA Title I Evaluation Handbook.¹ The handbook included instruction for completion of the individual forms, a glossary, a brief explanation of the models available for evaluation and a conversion table for changing percentile to normal curve equivalent (see Appendix B).

The central premise for developing the West Virginia data gathering instrument was to provide a system of collection which would supply appropriate data for the production of an impact report. The instrument had to be easily understood and easily completed with complexities kept at a minimum to reduce the resultant error from data manipulation. Further, the instrument had to provide the minimum

¹A copy of the ESEA Title I Evaluation Handbook may be obtained by contacting the Director, ESEA Title I, West Virginia Department of Education, Capitol Complex, Charleston, West Virginia 25305

information required by USOE, and it had to provide useful data for state Title I use.

The evaluation instrument was developed through a planned sequence of activities. A series of meetings were planned and carried out as the first major activity. These included four scheduled regional meetings in different areas of the state for the purpose of meeting face-to-face with LEA Title I personnel. All four meetings were held during the week of August 22-26, 1977. Three were held at state parks, while the fourth one was held at the state Title I Offices in Charleston. The locations and dates of the meetings were as follows:

Twin Falls (state park), Mullins, August 22

State Title I Offices, Charleston, August 23

North Bend (state park), Cairo, August 24

Canaan Valley (state park), Davis, August 25-26

The regional meetings with LEA Title I personnel provided for 2-2½ hours of personal contact with state Title I staff and Technical Assistance Center (TAC) personnel to discuss the types of data presently collected and its usability. For purposes of discussion, teams were established. A team was comprised of one state staff member, one TAC member, and Title I personnel from one LEA. Five teams functioned simultaneously. The teams' work included a review of the present testing program, types of programs provided students, methodology used in the program, instructional time in the programs, staff training programs, advisory council functions, cost of the programs, para-professionals used, and professionals used. Also, they entered into a constructive critique of present activities for the purpose of improving

present operations through minimal adjustments which would improve the data base during the transition period from the old form of evaluative reporting to the new form of evaluative reporting.

Summarization of the information elicited from LEA Title I personnel provided the state staff and TAC personnel with sufficient information to develop four basic questions and a draft evaluation instrument. The instrument was based on the commonalities of the available data at the LEA level. The draft, as was the final instrument, was designed to elicit data which could be used to show definitively the impact of Title I programs on the students. In an effort to increase definitiveness of impact, the following specific design steps were taken.

1. To separate impact by variation in instructional method, seven procedures were defined and an eighth was added for any method not included within the first seven.
2. To ascertain impact by time the number of days per week and the amount of instructional time per day were included.
3. To change pretest and posttest scores into mean gain scores a reporting procedure was made graphically explicit for that purpose. (See the evaluation handbook.)
4. To convert mean gain scores from percentiles to NCEs a table was provided in the evaluation handbook.

In addition to the collection of impact data, as noted above, there were common data available from the LEAs dealing with staff training, advisory council functions, paraprofessional functions, and professional functions. The evaluation instrument was designed to elicit some data relative to each of these facets of the Title I programs.

Through the efforts of the Assistant Director, Compensatory Education, and the West Virginia TAC representative, all draft forms for

the Title I evaluation instrument were assembled into a handbook (ESEA Title I Evaluation Handbook) which was subsequently sent to the state Title I regional personnel. The five regional personnel independently tested the evaluation instrument using a set of simulation data. Their findings from the simulations and a careful critique of the separate data forms led to important suggestions for editing the draft. An additional input into editing came from suggestions of state staff members and LEA Title I personnel following a meeting in the Title I Offices in Charleston. At this meeting, the State staff along with LEA personnel from three LEAs used simulation data to complete the forms. Editing which resulted in the final instrument was completed by the Assistant Director, Compensatory Education.

The final evaluation instrument was presented to all LEA Title I personnel in two meetings. The meetings were held on February 7-9, 1978, at Pipestem State Park (in southern West Virginia) and on February 13-15 at the Ramada Inn in Morgantown (in northern West Virginia). At each meeting a general overview was given which included the need for the instrument, how they would use the instrument, and how the collected data would be used. This was followed by dividing the LEA Title I personnel into five groups and assigning one TAC and one regional staff person to each group. Then, each group proceeded to use the evaluation instrument with a set of simulation data and information. State Title I staff members acted as observers carefully recording reactions of the LEA personnel as they proceeded through the simulation exercise. After the simulation, both written and verbal comments were received from the LEA personnel concerning usability of the data forms. These were used by the state Title I staff to clarify and explain to others in the

succeeding months as questions were raised when real data were used.

COMPLETION OF THE EVALUATION INSTRUMENT

For the collected data and information to have an acceptable validity and reliability, efficient completion of the many forms that make up the complete evaluation instrument was necessary. The first task was to administer tests at appropriate times to obtain the data. The testing was conducted by teachers in their classrooms. Then the data were placed on the forms at the building level either by the Title I teacher or LEA office personnel.

The aggregation of building level data to produce LEA data were completed by Title I personnel at the central offices. The aggregated data were forwarded to the state Title I staff.

State Title I staff with assistance from the staff in the Division of Research and Evaluation (DRE) reviewed the aggregated data, corrected it for omissions and errors, and produced the statewide aggregate from data presented by the LEAs.

DATA ANALYSIS PROCEDURES

State Title I staff assisted personnel in the Division of Research and Evaluation, Bureau of Planning, Research and Evaluation, in the development of a series of logical analysis procedures to be computer programmed for the purpose of fully analyzing the data. The programs were developed and data prepared for computer analysis by staff in the DRE. The computer programs were run on the state computers. The outcome from the series of computer programs produced the data which was tabulated in Section III of this report. Section III and Section IV explains the tabulated data and summarizes the results. The form and

substance of the explanation and interpretation in the last two sections of the report are the author's.

III. OUTCOMES OF THE ESEA TITLE I PROGRAM

This report on ESEA Title I outcomes in West Virginia for fiscal year 1977-78 is the culminating activity of a long sequence which began with the mandate of Congress for better information about the program's impact on students as set forth in the Education Amendments of 1974. (See Section I for details.) The method used to develop the data collection instrument, the data collection procedures and the method for completing the instrument, and the data analysis procedures are presented in Section II. In this section the findings (outcomes) of the study will be provided in response to a set of questions which were conceived and stated by West Virginia Title I staff as a part of the overall planning and development of the data collection instrument. Definitions of terms and an explanation of conditions are provided for an understanding of the data presented in response to the questions. Since the instrument was designed to supply data useful to LEAs and the State, as well as that mandated by Congress, it is unique to West Virginia.

QUESTIONS

To expedite the development of a data collection instrument which would provide data appropriate to the perceived need for information relevant to Title I impact, broad questions were stated. Those questions may be summarized as follows:

1. How many students participated in the Title I program?

2. How many participating students were tested (with a pretest and a posttest)?
3. From pretest to posttest, what were the mean gain scores in NCEs?
4. What was the cost of the Title I program per student per unit of gain (NCE)?

These broad questions were considered with respect to many variables. That is, in the case of student participants, the variables were grade level and subject. For the number of tested students the variables of presentation and grade level were considered. And, mean gain scores were considered with grade level, subject, time (hours per week), presentation procedure, and test dates as variables singularly and in various combinations. The cost figure considered the number of students and the mean number of units of gain in NCEs.

NOTES AND EXPLANATIONS

To assist the reader to understand the information presented in this section, an explanation of terms used and procedures followed in deriving and reporting the data is presented.

Cell. A cell refers to a single data position within a table. The position may or may not contain data.

Costs. Cost by subject per student per unit of gain (NCE) may not be exactly what the reader thinks. When the data was collected from the LEAs, cost by subject was not reported by grade level; it was reported by presentation procedure. Therefore, the variance in cost across grades, as shown herein, results from differences in the LEAs' reported expenditures for the presentation procedures and their reported number of participants. To provide a cost figure in this report, cost by presentation figure was considered equal across all grade levels. Cost

data were not collected for dual subject programs; that is, math-reading and reading-math. Therefore, no costs are presented in this report for dual subject programs.

NCE. An NCE represents a normal curve equivalent. The normal curve equivalent is a normalized curve which has been linearly transformed to match the percentile distribution at values of 1, 50, and 99. It has a mean of 50 and a standard deviation of 21.06 NCEs. NCEs are equal-interval scales, which makes it legitimate to use them in addition, subtraction, multiplication, and division.

NCE as an Equal-Interval Scale. Because NCEs are an equal-interval scale, one NCE does not always have the same equivalence as a percentile. The percentile is a score point below which a given percent of the tested students fall. At the lower and upper end of the NCE scale (as one approaches 1 NCE and 99 NCE) less than 2 NCEs are equivalent to 5 percentile, while there are approximately 9 NCEs for each 5 percentile near the 50th NCE. (see FIGURE 1). Therefore, as a group of below level (below the 50th NCE) students improve, equal percentile changes result in numerically larger NCE gains.

Presentation Procedure. Presentation procedure refers to the intervention process used with the students for the purpose of improving their performance in math and reading. The procedures were numbered and defined by the State Title I staff as follows:

1. Students removed from the regular class to receive services performed by an aide on a one-to-one basis.
2. Students removed from the regular class to participate in a group of two or more students being served by an aide.
3. Students removed from the regular class in groups of ten or more to participate in a Title I class or laboratory conducted by a teacher.

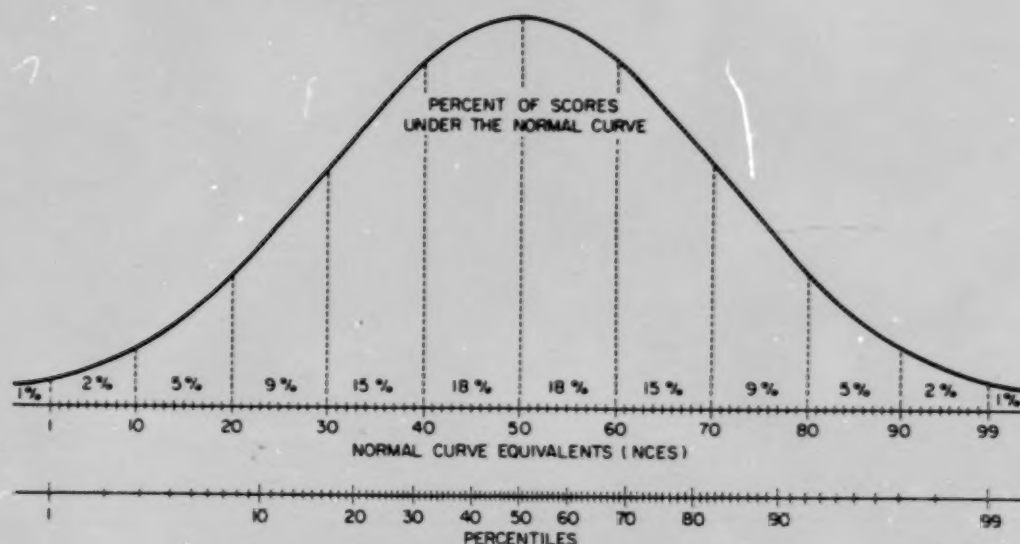


FIGURE 1

AREA UNDER THE NORMAL CURVE DIVIDED
INTO NCEs AND PERCENTILES

4. Students removed from the regular class in groups of fewer than ten to participate in a Title I class or laboratory conducted by a teacher.
5. Students removed from the regular class in groups of ten or more to participate in a Title I class or laboratory conducted by a teacher and an aide.
6. Students removed from the regular class in groups of fewer than ten to participate in a Title I class or laboratory conducted by a teacher and an aide.
7. Students receiving Title I services from a Title I aide in the regular classroom
8. If none of the procedures above is descriptive of the intervention process.

Program Identification. For discussion and analysis, Title I programs were separated into four subject based categories. These four categories were: (1) math program only, (2) math or a part of a math-reading program, (3) reading program only, and (4) reading or a part of

a reading-math program. Programs designated as math programs only provided special instruction in math, and math test data was collected for analysis and interpretation of the programs' impact. Those programs identified as math or a part of a math-reading program provided special instruction in both math and reading; however the test data and the interpretation under this heading was derived only from the students' math performance. Programs designated as reading programs provided special instruction in reading only, and reading test data was collected for analysis and interpretation of the programs' impact. Those programs identified as reading or a part of a reading-math program provided special instruction in both reading and math; however, the test data and the interpretation under this heading was derived only from the students' reading performance.

Screened Data. Tabled data which were screened were considered suspect by the author. The data were screened to alert the reader while retaining it for perusal if desired (see Suspect Data).

Suspect Data. To reduce the amount of data which may result from anomalies due to characteristics of an excessively small group (small n-count), tabled data based on less than an n-count of 10 was considered highly suspect. Further, any n-count of less than 50 remained suspect. Therefore, the narrative description in this section does not include such data. Although the author of this report does not have confidence in data derived from relatively small n-counts, the reader may peruse the data in this section as interest develops and need requires.

DATA DESCRIPTION SUMMARY

Forty-five of the 55 local education agencies in West Virginia

elected to report on Title I program impact using the new system of evaluation procedures as developed by RMC Research Corporation and modified by state Title I personnel. The following analysis and the total report is based on the data from the 45 LEAs that elected to use the new system.¹

Number of Title I Participants. The total unduplicated number of Title I participants from the 45 reporting LEAs was 28,645. This number was divided among the grades as shown in Table 1. One should note that the larger portion of the population is located in grades 1 through 7. Further, note that grade 1 includes special education students.

Table 2 indicates that fewer than 20 percent of the total participants in math and reading instruction were involved in math programs. The number of students in reading exceeded the number in math in each presentation procedure with the exception of presentation 2. The table shows the unduplicated count of students by presentation procedure. The table does not provide a count for those students involved in combination programs including both math and reading.

Total Number of Tested Participants. Table 3 shows the total number tested by subject, by grade, and by presentation procedure. The table indicates the dispersion of students tested by subject across all combinations of presentation procedure² and grade level. Presentation procedure 1 was used with a negligible number of students (5) in math programs, but was used with 1200 students in reading programs.

¹See Appendix C for a list of LEAs using the new system of evaluation procedures.

²See page 15 for explanation of process for each presentation procedure.

TABLE 1
TOTAL NUMBER OF PARTICIPANTS^a IN
TITLE I PROGRAMS

PARTICIPANTS					
Grade	Number	Grade	Number	Grade	Number
1 ^b	3499	5	4321	9	157
2	4980	6	3760	10	93
3	4960	7	1279	11	36
4	4399	8	618	12	40
TOTAL ALL GRADES		28645			

^aTotal number of participants is an unduplicated count.

^bFirst Grade count is inclusive of special education students.

TABLE 2
NUMBER OF PARTICIPANTS^a IN TITLE I PROGRAMS
BY SUBJECT AND PRESENTATION

PRESENTATION	SUBJECT	
	Math	Reading
1	3	1,741
2	1,165	920
3	45	930
4	1,551	6,620
5	188	2,861
6	527	5,618
7	254	687
8	55	328
TOTAL	3,788	19,705

^aUnduplicated number of participants in Math and Reading Programs which were not operated in conjunction with a dual program; i. e., Math-Reading or Reading-Math.

TABLE 3

NUMBER OF PARTICIPANTS TESTED IN TITLE I PROGRAM
BY SUBJECT, BY GRADE, AND BY PRESENTATION

GRADE	MATH PRESENTATION								GRADE	READING PRESENTATION							
	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0
2	0	436	0	78	98	116	75	20	2	590	190	208	1,199	530	695	144	47
3	1	464	13	143	130	141	106	26	3	343	203	228	1,545	507	671	169	175
4	1	544	11	558	96	283	137	31	4	96	182	229	1,466	542	1,030	84	105
5	0	503	2	756	71	140	61	33	5	69	155	234	1,046	552	781	79	66
6	2	394	0	602	21	102	149	14	6	67	78	250	744	566	600	117	16
7	0	42	31	52	18	0	7	0	7	20	87	113	551	234	81	7	0
8-9	1	13	49	11	0	0	0	0	8-9	15	10	157	194	281	56	4	0
10-12	0	0	0	0	0	0	0	0	10-12	0	0	0	95	47	0	0	0
1-12	5	2,396	106	2,200	434	782	535	124	1-12	1,200	908	1,419	6,840	3,259	3,914	604	409
Total All Grades - Math Presentation										Total all Grades - Reading Presentation							
6582										18553							

Presentation procedures 3 and 8 had 106 and 124 tested students, respectively. In both math and reading, most tested students were in grades 2 to 6 and had received instruction under procedures 2 through 7. In reading there was a notably larger number across all presentations at grades 7 and 8-9. Presentation 1 also had a large number tested in the reading program. Overall, nearly three times as many students were tested in reading as were tested in math.³

Mean Gain Scores by Subject, and by Grade. Tables 4-M and 4-R provide both mean gain scores and the cost per student in the program to achieve a unit of gain, an NCE.

When math was the only program activity the NCE gain by grade ranged from 3.7562 to 11.0479, while the gain was 3.2107 to 13.3868 when the math was a part of a combined math-reading program. The gain across all grades for math only was 7.7565 and was 7.2445 for math as a part of a combination program (Table 4-M).

The mean student cost per NCE gain in the math program only ranged by grade from \$29.51 to \$87.85 with an overall cost of \$42.93 per unit gain (Table 4-M).

Reading program activities produced a mean NCE gain per student from 4.0650 at the third grade to 7.6135 at the second grade. (The first grade gain of 22.0000 is probably an anomaly due to the small n-count of 3.) With reading as a part of a reading-math program, the gain score ranged from 3.6333 to 10.3580. Across all grades the gain was 5.7368 for the reading program alone and 4.9341 when in combination with math. It should be noted that the largest gain 10.3580 was achieved

³Some of the same students were tested in both math and reading.

TABLE 4-M
MATH MEAN GAIN SCORES BY SUBJECT
AND BY GRADE

GRADE	MATH PROGRAM ONLY			GRADE	MATH AS A PART OF MATH-READING PROGRAM ^a	
	N	Mean NCE Gain ^b	Cost/ Stud/ NCE		N	Mean NCE Gain ^b
1	0	- -	- -	1	0	- -
2	241	10.5412	32.82	2	582	13.3868
3	287	7.5254	45.05	3	737	4.5697
4	725	10.5092	32.35	4	936	7.1416
5	967	8.2500	39.88	5	599	6.2098
6	869	3.7562	87.85	6	415	5.8470
7	94	11.0479	29.51	7	56	3.2107
8-9	31	10.6323	24.64	8-9	44	5.0465
10-12	0	- -	- -	10-12	0	- -
1-12	3214	7.7565	42.93	1-12	3368	7.2445

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

TABLE 4-R
READING MEAN GAIN SCORES BY SUBJECT
AND BY GRADE

GRADE	READING PROGRAM ONLY			GRADE	READING AS A PART OF READING-MATH PROGRAM ^a	
	N	Mean NCE Gain ^b	Cost/ Stud/ NCE		N	Mean NCE Gain ^b
1	3	22.0000	22.72	1	0	- -
2	2995	7.6135	52.14	2	608	8.0985
3	3045	4.0650	92.50	3	796	3.6333
4	2968	5.6302	68.20	4	766	3.9611
5	2243	5.8431	64.69	5	739	4.8613
6	1975	4.8330	74.28	6	463	4.0287
7	1043	7.2101	44.80	7	50	10.3580
8-9	669	5.1803	53.28	8-9	48	6.1583
10-12	142	6.5810	22.03	10-12	0	- -
1-12	15083	5.7368	64.32	1-12	3470	4.9341

^aSeparate cost figures were not available for Reading programs when they were a part of a combined Reading-Math Program.

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^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

with a relatively small group of 50 students (Table 4-R).

Cost per student per NCE gain for those students in the reading program only ranged by grade from \$22.03 to \$92.50 with a mean cost across all grades of \$64.32 (Table 4-R).

Mean Gain Scores by Subject, by Grade, and by Time. Tables 5-M and 5-R show the effect of grade and time spent per week on the subject. The time in hours per week was determined by multiplying time spent per day by the number of days the students participated in the program. Cost data for math and reading programs when operated jointly were not collected; therefore, the cost for these programs was not reported here nor presented in the tables.

A large amount of the data presented in Table 5-M is suspect. NCE gains and cost per student per NCE are very suspect if it is based on fewer than 10 students (n-count). The data are somewhat suspect when the n-count is fewer than 50. A lesser amount of the data are suspect in Table 5-R which results from a larger overall n-count for all reading programs. Since this is the situation, data based on fewer than 10 and fewer than 50 will not be discussed further. The data are available in the tables for the readers general information.

In Table 5-M, the reader may note that the above stated n-counts reduce the interpretable data for the math program only to grade levels 2 through 7 with a total amount of time per week of 1.9-3.6 hours. For math as a part of a combination subject program, the same grade levels and times except grade 7, are interpretable, plus for each of the grades 2-6 the 0-1.8 hour per week category has sufficient n-counts.

With the above as the base for discussion, NCE gain for the math program alone, grades 2-7, 1.9 to 3.6 hours per week, ranged from

TABLE 5-M

MATH MEAN GAIN SCORES BY SUBJECT
BY GRADE, AND BY TIME

GRADE	MATH PROGRAM ONLY			GRADE	MATH AS A PART OF MATH-READING PROGRAM ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8	--	--	1	0-1.8	--	--
	1.9-3.6	--	--		1.9-3.6	--	--
	3.7-5.4	--	--		3.7-5.4	--	--
2	0-1.8	14.0444 (36)	35.18	2	0-1.8	19.3311 (174)	
	1.9-3.6	10.1725 (191)	30.57		1.9-3.6	10.8128 (368)	
	3.7-5.4	6.5643 (14)	67.02		3.7-5.4	11.2100 (40)	
3	0-1.8	4.0607 (28)	92.60	3	0-1.8	3.7777 (184)	
	1.9-3.6	7.8871 (258)	42.47		1.9-3.6	4.8475 (514)	
	3.7-5.4	11.1000 (1)	41.06		3.7-5.4	4.6462 (39)	
4	0-1.8	12.9333 (21)	34.09	4	0-1.8	6.2641 (301)	
	1.9-3.6	10.4144 (700)	32.26		1.9-3.6	7.9837 (597)	
	3.7-5.4	14.3750 (4)	27.76		3.7-5.4	0.8605 (38)	
5	0-1.8	15.2388 (67)	23.36	5	0-1.8	9.7827 (127)	
	1.9-3.6	7.7924 (895)	41.84		1.9-3.6	5.1777 (431)	
	3.7-5.4	-3.4000 (5)	c		3.7-5.4	5.9927 (41)	
6	0-1.8	31.3000 (2)	28.57	6	0-1.8	7.9684 (57)	
	1.9-3.6	3.4552 (850)	94.64		1.9-3.6	5.5960 (349)	
	3.7-5.4	6.6182 (11)	65.73		3.7-5.4	2.1444 (9)	
7	0-1.8	--	--	7	0-1.8	6.2893 (9)	
	1.9-3.6	9.2592 (71)	32.84		1.9-3.6	3.3961 (41)	
	3.7-5.4	16.5696 (23)	23.66		3.7-5.4	-2.4000 (6)	
8-9	0-1.8	--	--	8-9	0-1.8	7.2000 (1)	
	1.9-3.6	--	--		1.9-3.6	--	--
	3.7-5.4	10.6323 (31)	24.65		3.7-5.4	6.3024 (42)	
10-12	0-1.8	--	--	10-12	0-1.8	--	--
	1.9-3.6	--	--		1.9-3.6	--	--
	3.7-5.4	--	--		3.7-5.4	--	--
1-12	ALL TIMES	7.7112 (3208)	43.18	1-12	ALL TIMES	7.2445 (3368)	

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

^cMean Gain Score was negative.

TABLE 5-R

READING MEAN GAIN SCORES BY SUBJECT,
BY GRADE, AND BY TIME

GRADE	READING PROGRAM ONLY			GRADE	READING AS A PART OF READING-MATH PROGRAM ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8	--	--	1	0-1.8	--	--
	1.9-3.6	22.000 (3)	22.73		1.9-3.6	--	--
	3.7-5.4	--	--		3.7-5.4	--	--
2	0-1.8	6.9470 (879)	56.86	2	0-1.8	0.8642 (53)	
	1.9-3.6	8.1664 (1929)	51.19		1.9-3.6	9.6354 (514)	
	3.7-5.4	5.0438 (187)	69.59		3.7-5.4	-1.8171 (41)	
3	0-1.8	3.7107 (655)	106.18	3	0-1.8	0.1123 (57)	
	1.9-3.6	4.1824 (2191)	92.29		1.9-3.6	4.1271 (643)	
	3.7-5.4	3.9392 (199)	85.55		3.7-5.4	2.4167 (96)	
4	0-1.8	7.8585 (316)	41.36	4	0-1.8	14.0143 (21)	
	1.9-3.6	5.5642 (2452)	70.27		1.9-3.6	3.7780 (560)	
	3.7-5.4	2.9190 (200)	134.98		3.7-5.4	3.3741 (185)	
5	0-1.8	5.8428 (367)	53.40	5	0-1.8	12.9000 (24)	
	1.9-3.6	5.6253 (1772)	70.04		1.9-3.6	4.5790 (634)	
	3.7-5.4	9.5548 (104)	35.59		3.7-5.4	4.6889 (81)	
6	0-1.8	6.7796 (338)	47.20	6	0-1.8	3.4949 (39)	
	1.9-3.6	4.3866 (1527)	85.48		1.9-3.6	3.9866 (404)	
	3.7-5.4	5.0491 (110)	50.10		3.7-5.4	5.9200 (20)	
7	0-1.8	8.3779 (68)	32.94	7	0-1.8	32.2000 (1)	
	1.9-3.6	8.3185 (739)	39.55		1.9-3.6	9.1786 (42)	
	3.7-5.4	3.4025 (236)	93.17		3.7-5.4	14.3143 (7)	
8-9	0-1.8	5.6300 (60)	48.49	8-9	0-1.8	35.2000 (1)	
	1.9-3.6	5.9388 (420)	50.68		1.9-3.6	-5.1000 (5)	
	3.7-5.4	3.3519 (189)	66.23		3.7-5.4	6.8071 (42)	
10-12	0-1.8	--	--	10-12	0-1.8	--	--
	1.9-3.6	6.5810 (142)	22.03		1.9-3.6	--	--
	3.7-5.4	--	--		3.7-5.4	--	--
1-12	ALL TIMES	5.7368 (15083)	64.32	1-12	ALL TIMES	4.9341 (3470)	

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

3.4552 to 10.4144. The cost per student per NCE ranged from \$30.57 to \$94.64. Across all grades and all time categories the NCE gain was 7.7112 at a cost of \$43.18 per student per NCE.

Achievement as evidenced by NCE gains in math (when a part of a combined math-reading program) ranged from 4.8475 to 10.8128 (grades 2-6 with 1.0 to 3.6 hours per week in the program), and from 6.2889 to 19.311 (grades 2-6 with 0-1.8 hours per week in the program). For all grades and all time categories the gain was 7.2445 NCEs.

In Table 5-R the reading program only gains were:

3.7107 to 8.3779 NCEs for a contact time of 0-1.8 hours/week
4.1824 to 8.3185 NCEs for a contact time of 1.9-3.6 hours/week
2.9190 to 9.5548 NCEs for a contact time of 3.7-5.4 hours/week

The cost per student per NCE was respectively:

\$32.94 to \$106.18
\$22.03 to \$ 92.29
\$35.59 to \$134.98

Reading as a part of a reading-math program produced the following range of gains.

0.8642 to 0.1123 NCEs for a contact time of 0-1.8 hours/week
3.7780 to 9.6354 NCEs for a contact time of 1.9-3.6 hours/week
2.4167 to 4.6889 NCEs for a contact time of 3.7-5.4 hours/week

In all cases the figures exclude data with an n-count of less than 50.

Across all grades and all time categories the reading program only had a 5.7368 gain at a cost of \$64.32 per student per NCE. For reading in the combined program the gain was 4.9341 NCEs.

Mean Gain Scores by Subject, by Grade, and by Presentation. Tables 6-M and 6-R show the effect of grade and grouped presentation procedure on the subject. T-A refers to all presentation procedures using both a teacher and an aide; that is, procedures 5 and 6. When T is used only

TABLE 6-M

MATH MEAN GAIN SCORES BY SUBJECT,
BY GRADE, AND BY PRESENTATION

GRADE	MATH PROGRAM ONLY				GRADE	MATH AS A PART OF A MATH-READING PROGRAM ^a		
	Presentation ^b	Mean NCE Gains ^c & (N)	Cost/ Stud/ NCE			Presentation ^b	Mean NCE Gains ^c & (N)	
1	T-A	--	--	--	1	T-A	--	--
	T	--	--	--		T	--	--
	A	--	--	--		A	--	--
	OTH	--	--	--		OTH	--	--
2	T-A	18.4000 (40)	25.02		2	T-A	19.9816 (174)	
	T	8.8000 (8)	36.69			T	11.1001 (73)	
	A	10.4408 (185)	33.91			A	10.6641 (326)	
	OTH	9.7900 (11)	48.50			OTH	3.6556 (5)	
3	T-A	16.0678 (59)	17.12		3	T-A	3.6670 (212)	
	T	-12.8100 (18)	2			T	6.1261 (138)	
	A	6.8593 (209)	50.44			A	4.5746 (362)	
	OTH	11.1000 (1)	41.00			OTH	3.5600 (75)	
4	T-A	14.5481 (235)	25.02		4	T-A	9.1319 (144)	
	T	8.8042 (259)	36.69			T	7.0003 (310)	
	A	8.2838 (229)	40.20			A	7.3971 (453)	
	OTH	11.5500 (2)	39.48			OTH	-5.2441 (29)	
5	T-A	8.1616 (99)	48.40		5	T-A	3.2491 (112)	
	T	7.1655 (553)	44.52			T	6.1639 (205)	
	A	10.6252 (306)	30.02			A	7.9244 (258)	
	OTH	-4.8800 (9)	c			OTH	1.9075 (24)	
6	T-A	8.9391 (64)	52.24		6	T-A	3.9492 (59)	
	T	2.1404 (539)	147.63			T	5.0936 (63)	
	A	5.8576 (257)	54.97			A	6.5073 (288)	
	OTH	3.6556 (9)	124.74			OTH	-0.3000 (8)	
7	T-A	10.3000 (18)	25.78		7	T-A	11.1000 (8)	
	T	10.1611 (36)	32.48			T	-5.6167 (6)	
	A	11.0410 (43)	26.17			A	3.8700 (47)	
	OTH	--	--	--		OTH	--	--
8-9	T-A	--	--	--	8-9	T-A	--	--
	T	-4.5000 (18)	27.25			T	-4.5000 (42)	
	A	-4.5000 (15)	15.90			A	7.2000 (11)	
	OTH	--	--	--		OTH	--	--
10-12	T-A	--	--	--	10-12	T-A	--	--
	T	--	--	--		T	--	--
	A	--	--	--		A	--	--
	OTH	--	--	--		OTH	--	--
1-12	ALL PRESENTATIONS	7.7565 (3214)	42.14		1-12	ALL PRESENTATIONS	7.2445 (3368)	

^aSeparate cost figures were not available for math programs when they were a part of a combined Math Reading Program.

^bIn this table procedures with instructional personnel commonality are grouped and reported as one presentation. That is, T-A refers to teacher and aide, T refers to teacher only, A refers to aide only, and OTH refers to any other presentation.

^cMean gain scores are stated in NCEs (Normal Curve Equivalents).

^dMean Gain Score was negative.

TABLE 6-R
READING MEAN GAIN SCORES BY SUBJECT,
BY GRADE, AND BY PRESENTATION

GRADE	READING PROGRAM ONLY			GRADE	READING AS A PART OF READING-MATH PROGRAM ^a		
	Method ^b	Mean NCE Gains ^c & (N)	Cost/ Stud/ NCE		Method ^b	Mean NCE Gains ^c & (N)	
1	T-A	-- --	--	1	T-A	-- --	--
	T	-- --	--		T	-- --	--
	A	22.000 (3)	22.23		A	-- --	--
	OTH	-- --	--		OTH	-- --	--
2	T-A	9.0814 (2995)	45.37	2	T-A	11.1381 (260)	
	T	6.3989 (1171)	60.95		T	6.7953 (236)	
	A	7.9850 (839)	47.34		A	3.7624 (85)	
	OTH	3.2100 (125)	44.25		OTH	3.3704 (27)	
3	T-A	5.1231 (791)	78.86	3	T-A	5.3711 (387)	
	T	3.4133 (1515)	102.54		T	3.0271 (258)	
	A	4.7837 (620)	82.36		A	-2.6211 (95)	
	OTH	1.5840 (119)	267.68		OTH	5.0268 (56)	
4	T-A	6.7574 (1210)	62.75	4	T-A	4.0898 (362)	
	T	4.8658 (1415)	71.11		T	2.8400 (280)	
	A	3.8760 (262)	97.27		A	7.9300 (100)	
	OTH	7.8198 (81)	51.79		OTH	-1.4578 (24)	
5	T-A	5.0639 (983)	82.35	5	T-A	4.6609 (350)	
	T	6.5675 (1021)	51.93		T	4.4660 (259)	
	A	6.6302 (202)	55.20		A	6.9099 (101)	
	OTH	2.2563 (37)	186.11		OTH	3.8769 (29)	
6	T-A	4.5462 (919)	90.41	6	T-A	3.2931 (247)	
	T	4.9934 (873)	64.09		T	6.1455 (121)	
	A	5.1770 (174)	53.51		A	2.2659 (88)	
	OTH	11.9711 (9)	25.44		OTH	15.5871 (7)	
7	T-A	4.9218 (312)	78.02	7	T-A	6.3000 (3)	
	T	7.3055 (618)	41.34		T	10.1283 (46)	
	A	13.0062 (113)	27.99		A	12.2000 (1)	
	OTH	-- --	--		OTH	-- --	--
8-9	T-A	6.0443 (332)	47.98	8-9	T-A	6.1000 (5)	
	T	4.2427 (309)	57.99		T	6.8071 (42)	
	A	5.2321 (128)	86.68		A	13.2000 (1)	
	OTH	-- --	--		OTH	-- --	--
10-12	T-A	7.8936 (47)	8.84	10-12	T-A	-- --	--
	T	6.0305 (95)	30.51		T	-- --	--
	A	-- --	--		A	-- --	--
	OTH	-- --	--		OTH	-- --	--
1-12	ALL METHODS	5.7368 (15083)	64.32	1-12	ALL METHODS	4.9341 (3470)	

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMethod is presentation procedure. In this table procedures with instructional personnel commonality are grouped and reported as one method. That is, T-A refers to teacher and aide, T refers to teacher only, A refers to aide only, and OTH refers to any other method.

^cMean gain scores are stated in NCEs (Normal Curve Equivalents).

a teacher was involved in the procedures (procedures 3 and 4). If only an aide was involved with the student, the procedure is referenced with an A. OTH signifies the procedure was different than the three described.

When suspect data was removed from Table 6-M, the major portion of reportable data was for grades 2 to 6. With math as the program focus, the T-A procedure resulted in an NCE gain of 8.1616 to 16.0678. Overall gains were not as high for the T procedure: 2.1404 to 8.8042 NCEs. Gains experienced by students under an aide only (A) was good with a range of 5.8576 to 10.6252 NCEs. The cost per student per NCE was \$17.12 to \$52.24 for the T-A procedure, \$36.69 to \$147.63 for the T procedure, and \$33.91 to \$54.97 for the A procedure.

The overall gain was 7.7565 NCEs at a cost of \$42.14 per student per NCE. With math as a part of a math-reading program, the T-A procedure resulted in NCE gains of 3.2491 to 19.9816. The spread of the gain for the T procedure was less than the T-A with a range of 5.0936 to 11.1001 NCEs. For aide (A) procedure gains, there was little difference than when math was taught alone: 4.5746 to 10.6641 NCEs. The overall gain was 7.2445 NCEs.

The total n-counts in Table 6-R are much larger than those in Table 6-M. The result is a table with a greater quantity of usable data; also, one may have more confidence in the outcomes.

For the reading program only: The T-A procedure produced gains of 4.5462 to 9.0184 NCEs at a cost of \$45.37 to \$90.41 per student per NCE gain; the T procedure produced gains of 3.4133 to 7.3055 NCEs at a cost of \$30.51 to \$102.54 per student per NCE gain; and the A procedure produced gains of 3.4133 to 7.9850 NCEs at a cost of \$30.51 to \$102.54

per student per NCE gain. Overall the mean gain was 5.7368 NCEs at a cost of \$64.32 per student per NCE.

Data collected on reading programs as a part of a reading-math program indicated the following variances in gain scores:

For the T-A procedure, gains from 3.2931 to 11.1381 NCEs.

For the T procedure, gains from 2.8400 to 6.7953 NCEs.

For the A procedure, gains from -2.6211 to 7.9300 NCEs.

Overall the mean gain was 4.9341 NCEs.

Mean Gain Scores by Subject and by Presentation. In Tables 7-M and 7-R, the individual cells provide gain and cost data by presentation for math and reading. Math mean gains ranged from 5.2791 to 13.7902 and from 0.1228 to 8.9559 NCEs for the math program only and the math-reading program, respectively. Overall gains were 7.7565 and 7.2445, respectively. Cost per student per NCE for the math program only ranged from \$27.78 to \$60.62 with the mean across all presentation procedures equaling \$42.93. Reading mean gains ranged from 4.0481 to 9.3649 and from 0.5914 to 7.9164 NCEs for the reading program alone and the reading-math program, respectively. Cost per student per NCE for the reading program only ranged from \$28.01 to \$102.52 with the mean across all presentation procedures equaling \$64.32.

Mean Gain Scores by Subject, by Grade, and by Test Dates. Tables 8-M and 8-R were designed to provide differences in mean gain scores when testing dates change. The test dates are either spring-to-spring (S & S) or fall-to-spring (F & S).

In the math programs only, NCE gains vary from 4.7529 to 10.0565 for the spring-to-spring testing and from 3.1719 to 14.3483 for the fall-to-spring testing. Costs as reported, vary from \$31.92 to \$66.70 and from \$10.66 to \$46.26 per student per NCE, respectively for the two

TABLE 7-M
MATH MEAN GAIN SCORES BY SUBJECT
AND BY PRESENTATION

PRESENTATION	MATH PROGRAM ONLY			PRESENTATION	MATH AS A PART OF MATH-READING PROGRAM	
	N	Mean NCE Gain	Cost/Stud/NCE		N	Mean NCE Gain
1	2	12.4500	28.19	1	3	5.8887
2	1001	9.1783	34.87	2	1395	7.7321
3	24	8.5208	36.03	3	82	5.0866
4	1404	5.2791	60.62	4	796	6.7790
5	136	8.9868	36.17	5	298	8.6017
6	376	13.7902	27.78	6	406	8.9559
7	239	6.5385	57.51	7	296	5.4284
8	32	4.0875	111.56	8	92	0.1228
TOTALS	3214	7.7565	42.93		3368	7.2445

TABLE 7-R
READING MEAN GAIN SCORES BY SUBJECT
AND BY PRESENTATION

PRESENTATION	READING PROGRAM ONLY			PRESENTATION	READING AS A PART OF READING-MATH PROGRAM	
	N	Mean NCE Gain	Cost/Stud/NCE		N	Mean NCE Gain
1	1119	4.9438	73.43	1	81	0.5914
2	719	9.3649	43.03	2	189	7.9164
3	1331	8.1748	28.01	3	88	4.5341
4	5686	4.5959	79.64	4	1154	4.7080
5	2599	6.4332	57.52	5	660	6.4548
6	2960	5.8555	73.95	6	954	4.8572
7	403	5.2635	65.36	7	201	1.4149
8	266	4.0481	102.52	8	143	3.9650
TOTALS	15083	5.7368	64.32		3470	4.9341

TABLE 8-M

MATH MEAN GAIN SCORES BY SUBJECT,
BY GRADE, AND BY TEST DATES

GRADE	MATH PROGRAM ONLY				GRADE	MATH AS A PART OF MATH-READING PROGRAM ^a			
	Test Dates ^b	N	Mean NCE Gain ^c	Cost/ Stud/ NCE		Test Dates ^b	N	Mean NCE Gain ^c	
1	S & S F & S	-- --	-- --	-- --	1	S & S F & S	-- --	-- --	
2	S & S F & S	192 43	9.3557 17.3529	33.99 28.12	2	S & S F & S	360 222	10.3381 18.3306	
3	S & S F & S	212 75	5.7377 12.5787	55.42 31.80	3	S & S F & S	459 278	2.9440 7.2540	
4	S & S F & S	638 87	9.9857 14.3483	33.55 26.00	4	S & S F & S	697 239	6.5633 8.8280	
5	S & S F & S	356 611	10.0565 7.1975	31.92 46.26	5	S & S F & S	363 236	4.1887 9.3186	
6	S & S F & S	297 569	4.7529 3.1719	66.70 10.66	6	S & S F & S	336 79	4.2208 12.7633	
7	S & S F & S	88 19	12.3447 11.8532	29.88 26.98	7	S & S F & S	53 9	2.7642 11.8532	
8-9	S & S F & S	18 13	4.5889 18.0000	56.88 19.95	8-9	S & S F & S	83 --	4.5889 --	
10-12	S & S F & S	-- --	-- --	-- --	10-12	S & S F & S	-- --	-- --	
1-12	ALL TEST DATES	3198	7.7813	42.79	1-12	ALL TEST DATES	3368	7.2445	

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bTest Dates refer to the pretest and posttest dates. S & S means pretest was in the spring followed by posttest the next spring. F & S means pretest was in the fall followed by posttest the next spring.

^cMean gain scores are stated in NCEs (Normal Curve Equivalents).

TABLE 8-R
READING MEAN GAIN SCORES BY SUBJECT,
BY GRADE, AND BY TEST DATES

GRADE	READING PROGRAM ONLY				GRADE	READING AS A PART OF READING-MATH PROGRAM ^a		
	Test Dates ^b	N	Mean NCE Gain ^c	Cost/ Stud/ NCE		Test Dates ^d	N	Mean NCE Gain ^c
1	S & S F & S	3 --	22.000 --	22.73 --	1	S & S F & S	-- --	-- --
2	S & S F & S	1915 1080	3.7228 14.5123	110.94 25.29	2	S & S F & S	364 244	5.5126 11.9561
3	S & S F & S	2134 898	1.8271 9.4321	209.08 38.06	3	S & S F & S	514 282	0.4578 9.4213
4	S & S F & S	2269 699	4.6835 8.7034	83.91 41.01	4	S & S F & S	523 243	2.9585 6.1189
5	S & S F & S	1461 782	4.2942 8.7367	88.72 42.58	5	S & S F & S	516 221	4.4795 5.7715
6	S & S F & S	1316 659	3.6949 7.1058	96.08 51.65	6	S & S F & S	354 109	3.3271 6.3073
7	S & S F & S	644 399	5.8778 9.3604	57.16 32.16	7	S & S F & S	47 2	10.5973 6.0000
8-9	S & S F & S	344 325	4.1948 6.2234	72.23 39.85	8-9	S & S F & S	43 1	7.4574 -5.1000
10-12	S & S F & S	-- 142	-- 1.9567	-- 74.10	10-12	S & S F & S	-- --	-- --
1-12	ALL TESTS DATES	15070	5.7412	64.27	1-12	ALL TESTS DATES	3468	4.9354

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bTest Dates refer to the pretest and posttest dates. S & S means pretest was in the spring followed by posttest the next spring. F & S means pretest was in the fall followed by posttest the next spring.

^cMean gain scores are stated in NCEs (Normal Curve Equivalents).

testing periods. When math was a part of a math-reading program the gains changed to 2.9440 to 10.3381 for spring-to-spring and 7.2540 to 18.3306 for fall-to-spring. The math program only had an overall mean gain of 7.7813 NCEs, while the math in a combination program had a mean gain of 7.2445 NCEs. Overall cost for math alone was \$42.79 per student per NCE.

In the reading programs only, NCE gains vary from 1.8271 to 5.8778 for the spring-to-spring testing and from 1.9567 to 14.5123 for the fall-to-spring testing. Costs as reported vary from \$57.16 to \$209.08 and from \$25.29 to \$74.10 per student per NCE, respectively for the two testing periods. When reading was a part of a reading-math program the gain changed to 0.4578 to 5.5126 for spring-to-spring and to 5.7715 to 11.9561 for fall-to-spring. The reading program only had an overall mean gain of 5.7412 NCEs while the reading in a combination program had a mean gain of 4.9354 NCEs. Overall cost for the reading program alone was \$64.27 per student per NCE.

Mean Gain Scores by Subject, by Presentation, and by Time. In Tables 9-M and 9-R, the individual cells provide both mean gain scores and the cost per student in the program to achieve a unit of gain, an NCE.

When suspect data was eliminated in Table 9-M, only one n-count for the time category 0-1.8 hours per week was large enough to provide reliable gain scores. This n-count was under presentation 2. This presentation to 147 students produced a mean gain of 13.1292 NCEs at an average cost of \$31.46 per student per NCE. The time category 1.9-3.6 hours produced changes, at various presentation procedures, of 5.2218 to 8.9868 NCEs. All data for the time category 3.7 to 5.4 were suspect

TABLE 9-M
MATH MEAN GAIN SCORES BY SUBJECT,
BY PRESENTATION, AND BY TIME

PRESENTATION	MATH PROGRAM ONLY			PRESENTATION	MATH AS A PART OF MATH-READING PROGRAM ^a		
	Time: Hr./Wk.	Mean NCE Gains ^b & (N)	Cost/ Stud/ NCE		Time: Hr./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8	12.4500	(2) 28.19	1	0-1.8	7.2000	(1)
	1.9-3.6	- -	- - - -		1.9-3.6	-12.4000	(2)
	3.7-5.4	- -	- - - -		3.7-5.4	- -	- -
2	0-1.8	13.1292	(147) 31.46	2	0-1.8	16.0892	(158)
	1.9-3.6	8.0970	(826) 37.54		1.9-3.6	6.6488	(1218)
	3.7-5.4	17.1591	(22) 15.44		3.7-5.4	7.6842	(19)
3	0-1.8	-1.5000	(2) -	3	0-1.8	5.0866	(82)
	1.9-3.6	- -	- - - -		1.9-3.6	8.4149	(47)
	3.7-5.4	9.4318	(22) 30.75		3.7-5.4	3.3029	(35)
4	0-1.8	7.5333	(3) 32.52	4	0-1.8	4.9592	(277)
	1.9-3.6	5.2218	(1391) 61.09		1.9-3.6	7.7217	(492)
	3.7-5.4	12.5700	(10) 39.38		3.7-5.4	8.2704	(27)
5	0-1.8	- -	- - - -	5	0-1.8	8.6017	(298)
	1.9-3.6	8.9868	(136) 36.16		1.9-3.6	8.4254	(279)
	3.7-5.4	- -	- - - -		3.7-5.4	11.1095	(19)
6	0-1.8	- - -	- - - -	6	0-1.8	11.3944	(107)
	1.9-3.6	13.9229	(366) 27.51		1.9-3.6	8.1607	(280)
	3.7-5.4	8.9300	(10) 42.44		3.7-5.4	6.9421	(19)
7	0-1.8	- -	- - - -	7	0-1.8	6.8290	(31)
	1.9-3.6	6.5385	(239) 57.51		1.9-3.6	4.0978	(231)
	3.7-5.4	- -	- - - -		3.7-5.4	13.1912	(34)
8	0-1.8	0.6000	(7) 760.00	8	0-1.8	- -	- -
	1.9-3.6	- -	- - - -		1.9-3.6	-5.3636	(11)
	3.7-5.4	8.0640	(25) 90.05		3.7-5.4	0.8679	(81)
1-8	ALL TIMES	7.7112	(3208) 43.18	1-8	ALL TIMES	7.2445	(3368)

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

^cMean Gain Score was negative.

TABLE 9-R

READING MEAN GAIN SCORES BY SUBJECT,
BY PRESENTATION, AND BY TIME

PRESENTATION	Time: Hr./Wk.	READING PROGRAM ONLY			PRESENTATION	Time: Hr./Wk.	READING AS A PART OF READING-MATH PROGRAM ^a	
		Mean NCE Gains ^b & (N)	Cost/ Stud/ NCE				Mean NCE Gains ^b & (N)	
1	0-1.8	4.9480	(1104)	72.76	1	0-1.8	0.5775	(80)
	1.9-3.6	4.6333	(15)	133.30		1.9-3.6	1.7000	(1)
	3.7-5.4	- -	- -	- -		3.7-5.4	- -	- -
2	0-1.8	9.3000	(47)	82.37	2	0-1.8	10.1292	(72)
	1.9-3.6	9.3885	(626)	40.26		1.9-3.6	5.4407	(81)
	3.7-5.4	9.1109	(48)	40.72		3.7-5.4	9.0611	(56)
3	0-1.8	- -	- -	- -	3	0-1.8	- -	- -
	1.9-3.6	9.4807	(976)	24.15		1.9-3.6	2.9152	(46)
	3.7-5.4	4.5842	(355)	49.74		3.7-5.4	6.3071	(42)
4	0-1.8	6.7301	(1271)	42.50	4	0-1.8	-0.8200	(5)
	1.9-3.6	4.0590	(4202)	96.58		1.9-3.6	4.7034	(1120)
	3.7-5.4	2.4516	(213)	128.08		3.7-5.4	5.8379	(29)
5	0-1.8	- -	- -	- -	5	0-1.8	6.4548	(660)
	1.9-3.6	7.0431	(2197)	51.68		1.9-3.6	7.1256	(562)
	3.7-5.4	3.0995	(402)	129.70		3.7-5.4	2.6082	(98)
6	0-1.8	7.4497	(159)	44.43	6	0-1.8	-2.7000	(5)
	1.9-3.6	5.5929	(2669)	78.85		1.9-3.6	5.2831	(859)
	3.7-5.4	9.2455	(132)	41.86		3.7-5.4	1.2122	(90)
7	0-1.8	7.0000	(99)	54.57	7	0-1.8	2.9971	(34)
	1.9-3.6	4.7683	(278)	69.63		1.9-3.6	0.6880	(125)
	3.7-5.4	3.9462	(26)	80.84		3.7-5.4	2.2976	(42)
8	0-1.8	10.8000	(3)	52.69	8	0-1.8	- -	- -
	1.9-3.6	4.1774	(212)	94.08		1.9-3.6	15.3250	(8)
	3.7-5.4	3.1137	(51)	158.65		3.7-5.4	3.2919	(135)
1-8	ALL TIMES	5.7368	(15083)	64.32	1-8	ALL TIMES	4.9341	(3470)

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

due to small n-counts.

The array of mean gain scores under math as a part of math-reading programs indicated NCE gains of 4.9592 to 16.0892 in the 0-1.8 hours per week time category. The range was 4.0978 to 8.4254 NCEs when the time was increased to 1.9-3.6 hours. At 3.7-5.4 hours per week only data from presentation number 8 was free of suspicion. Presentation 8 produced an average gain of 0.8679 NCEs for 81 students.

Costs for the math program only varied from \$27.51 to \$61.09 for 1.9-3.6 hours of instruction per week.

For all time categories and all presentation procedures the mean NCE gains were 7.7112 for math programs only and 7.2445 for math in a combined program. The cost for math programs only was \$43.18 per student per NCE.

The reader may note the larger n-counts associated with gain scores and costs in Table 9-R. This reduces the amount of suspect data (the screened data) and increases our confidence in the data as presented.

For the reading programs only the total n-count was 15,083 which produced a mean NCE gain of 5.7368 at a cost of \$64.32 per student per NCE. This is subdivided into NCE gains of 4.9480 to 7.4497, 4.0590 to 9.3885, and 2.4516 to 9.2455 for hours of instruction of 0-1.8, 1.9-3.6, and 3.7-5.4, respectively. In the same order, the cost per student per NCE gain ranged from \$42.50 to \$72.76, \$24.15 to \$96.58, and \$41.86 to \$129.70.

Fewer students were involved in reading programs when they were a part of a reading-math program which caused smaller n-counts and more suspect data. In these programs, 3,470 students had a mean NCE gain of 4.9341. Subdividing the gains by time categories shows NCE changes of

0.5775 and 10.1292 with instruction of 0-1.8 hours, 0.6880 and 7.1256 with instruction of 1.9-3.6 hours, and 1.2122 to 3.2919 with instruction of 3.7-5.4 hours.

Mean Gain Scores by Subject, by Presentation, and by Test Dates.

The cell data in Tables 10-M and 10-R show the effect of presentation procedure and test dates on the subject.

In the math program only across presentation 2 through 7, the mean NCE gain scores for spring-to-spring testing ranged from 6.5385 to 12.6003 with a cost per student per unit gain of \$25.87 to \$57.50. Under the same conditions except for a change in test dates--fall-to-spring, gains were 3.7332 to 17.9262 NCEs with costs from \$27.09 to \$84.38. Overall, an NCE gain of 7.7813 was recorded at a cost of \$42.93 per student per NCE (Table 10-M).

Math as a part of a math-reading program with the same variables considered, produced changes of 0.1228 to 6.5398 NCEs for the spring-to-spring testing and 8.0853 to 13.8059 NCEs for the fall-to-spring testing. The overall gain was 7.2445 NCEs (Table 10-M).

Changes in reading performance are provided in Table 10-R. Changes in NCE ranged from: 2.0365 to 5.2635 for the spring-to-spring testing in the reading program only, 8.4502 to 11.3630 for the fall-to-spring testing in reading program only, 1.4149 to 7.0250 for the spring-to-spring testing in reading as a part of a combined program, and 5.0428 to 10.2418 for the fall-to-spring testing in reading as a part of a combined program. The costs per student per NCE gained for the first two categories was \$55.41 to \$177.76, and \$33.50 to \$57.16. Total mean gains were 5.7412 and 4.9354 NCEs for the reading program only and for reading as a part of a combined program, respectively. The total mean cost for

TABLE 10-M

MATH MEAN GAIN SCORES BY SUBJECT,
BY PRESENTATION, AND TEST DATES

PRESENTATION	MATH PROGRAM ONLY				PRESENTATION	MATH AS A PART OF MATH-READING PROGRAM ^a		
	Test Dates ^b	Mean NCE Gains ^c & (N)		Cost/ Stud/ NCE		Test Dates ^b	Mean NCE Gains ^c & (N)	
1	S & S F & S	12.4500 --	(2) --	38.19 --	1	S & S F & S	-5.8547 --	(3) --
2	S & S F & S	7.4959 14.2868	(741) (251)	39.76 27.09	2	S & S F & S	5.9262 15.7230	(1138) (3)
3	S & S F & S	8.8228 --	(2) --	28.30 --	3	S & S F & S	5.0866 --	(82) --
4	S & S F & S	8.9556 3.7332	(421) (976)	37.30 84.38	4	S & S F & S	5.6616 8.0853	(429) (367)
5	S & S F & S	-- 8.9868	-- (136)	-- 36.16	5	S & S F & S	-- 8.6017	-- (298)
6	S & S F & S	12.6003 17.9262	(292) (84)	25.87 32.47	6	S & S F & S	6.5398 13.8059	(271) (135)
7	S & S F & S	6.5385 --	(239) --	57.50 --	7	S & S F & S	5.4284 --	(296) --
8	S & S F & S	4.0875 --	(32) --	111.66 --	8	S & S F & S	0.1228 --	(92) --
1-8	ALL TEST DATES	7.7813	(3198)	42.93	1-8	ALL TEST DATES	7.2445	(3368)

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bTest Dates refer to the pretest and posttest dates. S & S means pretest was in the spring followed by posttest the next spring. F & S means pretest was in the fall followed by posttest the next spring.

^cMean gain scores are stated in NCEs (Normal Curve Equivalents).

TABLE 10-R
READING MEAN GAIN SCORES BY SUBJECT,
BY PRESENTATION, AND TEST DATES

PRESENTATION	READING PROGRAM ONLY				PRESENTATION	READING AS A PART OF READING-MATH PROGRAM ^a			
	Test Dates ^b	Mean NCE Gains ^c & (N)		Cost/ Stud/ NCE		Test Dates ^b	Mean NCE Gains ^c & (N)		
1	S & S	2.0365	(753)	177.76	1	S & S	7.0250	(132)	
	F & S	10.9251	(366)	33.50		F & S	10.2418	(55)	
2	S & S	3.7595	(163)	124.75	2	S & S	4.5341	(88)	
	F & S	11.0083	(556)	34.79		F & S	--	--	
3	S & S	4.6739	(403)	55.41	3	S & S	4.5178	(736)	
	F & S	9.6950	(928)	22.28		F & S	5.0428	(418)	
4	S & S	3.5220	(4494)	108.74	4	S & S	2.2063	(268)	
	F & S	8.7322	(1179)	34.47		F & S	9.3594	(392)	
5	S & S	3.9994	(1740)	96.26	5	S & S	2.8794	(747)	
	F & S	11.3630	(859)	29.92		F & S	11.9947	(207)	
6	S & S	4.3299	(1864)	93.07	6	S & S	1.4149	(201)	
	F & S	8.4502	(1096)	57.16		F & S	--	--	
7	S & S	5.2635	(403)	65.36	7	S & S	3.9650	(143)	
	F & S	--	--	--		F & S	--	--	
8	S & S	4.0481	(266)	102.52	8	S & S			
	F & S	--	--	--		F & S			
1-8	ALL TEST DATES	5.7412	(15070)	64.27	1-8	ALL TEST DATES	4.9354	(3468)	

^a Separate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^b Test Dates refer to the pretest and posttest dates. S & S means pretest was in the spring followed by posttest the next spring. F & S means pretest was in the fall followed by posttest the next spring.

^c Mean gain scores are stated in NCEs (Normal Curve Equivalents).

the reading program only was \$64.27 per student per NCE gain.

Mean Gain Scores by Presentation, by Subject, by Grade, and by Time.

All tables labeled as Table 11 relate to the same set of variables: presentation, subject, grade, and time. The letters M and R in the table designation are used to distinguish between the subjects math and reading. The number which comes between the 11 and the letter M or R designates the presentation procedure (numbered 1 through 8).

All tables labeled as Table 11 are discussed in sets. One set for each presentation procedure. One table of the set deals with math, and the second table deals with reading.

Tables 11-1-M and 11-1-R show the limited extent of participation by students in programs which utilized presentation procedure 1. Participation in math programs which utilized procedure 1 was so infrequent that all data in Table 11-1-M was suspect, and the data in Table 11-1-R was not appreciably better. Only in the reading program was NCE gains based on n-counts of sufficient size to instill adequate confidence for interpretation. At five grade levels gains ranged from 2.2095 to 6.8231 NCEs for the time category of 0-1.8 hours. The cost per student was \$43.35 to \$165.65 per NCE gain. Across all variables when presentation procedure 1 was used the NCE mean gain was 4.9438 and 0.5914 for reading programs only and reading as a part of reading-math program, respectively. The cost per student per NCE gain for the 4.9438 NCEs was \$73.42.

Because of small n-count most data in Table 11-2-M and 11-2-R were suspect as it was in the two previous tables. Of the non-suspect math program only data in Table 11-2-M, only one case in the 0-1.8 hours per week falls outside the 1.9-3.6 hours per week category. The NCE gain score ranged from 5.8031 to 9.714 for this category with a cost of \$31.30

TABLE 11-1-M

MATH MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	MATH PROGRAM: PRESENTATION # 1				GRADE	MATH AS A PART OF MATH-READING PROGRAM: PRESENTATION # 1 ^a			
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		
1	0-1.8	--	--	--	1	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
2	0-1.8	--	--	--	2	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
3	0-1.8	20.4000	(1)	24.25	3	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
4	0-1.8	4.5000	(1)	45.70	4	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
5	0-1.8	--	--	--	5	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
6	0-1.8	--	--	--	6	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	-12.4000	(2)	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
7	0-1.8	--	--	--	7	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
8-9	0-1.8	--	--	--	8-9	0-1.8	7.2000	(1)	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
10-12	0-1.8	--	--	--	10-12	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
1-12	ALL TIMES	12.4900	(2)	28.11	1-12	ALL TIMES	-5.9667	(3)	

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

TABLE 11-1-R
READING MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	READING PROGRAM: PRESENTATION # 1				GRADE	READING AS A PART OF READING-MATH PROGRAM: PRESENTATION # 1 ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8	--	--	--	1	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
2	0-1.8	6.8231	(549)	54.37	2	0-1.8	1.2375	(40)
	1.9-3.6	34.6000	(1)	18.09		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
3	0-1.8	2.6583	(307)	135.04	3	0-1.8	0.5813	(32)
	1.9-3.6	3.5000	(4)	178.00		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
4	0-1.8	2.2095	(95)	165.65	4	0-1.8	--	--
	1.9-3.6	-8.7000	(1)	c		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
5	0-1.8	3.3469	(64)	88.74	5	0-1.8	--	--
	1.9-3.6	2.9600	(5)	211.49		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
6	0-1.8	6.0436	(55)	43.35	6	0-1.8	-8.5000	(7)
	1.9-3.6	3.7000	(4)	160.27		1.9-3.6	1.7000	(1)
	3.7-5.4	--	--	--		3.7-5.4	--	--
7	0-1.8	4.5000	(20)	85.78	7	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
8-9	0-1.8	3.8643	(14)	129.13	8-9	0-1.8	35.2000	(1)
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
10-12	0-1.8	--	--	--	10-12	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
1-12	ALL TIMES	4.9438	(1119)	73.42	1-12	ALL TIMES	0.5914	(81)

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

^cMean gain score was negative.

TABLE 11-2-M

MATH MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	MATH PROGRAM: PRESENTATION # 2				GRADE	MATH AS A PART OF MATH-READING PROGRAM: PRESENTATION # 2 ^a			
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		
1	0-1.8	--	--	--	1	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
2	0-1.8	14.7382	(34)	34.34	2	0-1.8	10.9100	(30)	
	1.9-3.6	9.7114	(118)	31.30		1.9-3.6	9.9523	(264)	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
3	0-1.8	3.4554	(27)	107.65	3	0-1.8	9.0474	(19)	
	1.9-3.6	6.2409	(132)	52.72		1.9-3.6	4.5346	(286)	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
4	0-1.8	13.3450	(20)	33.85	4	0-1.8	15.8769	(39)	
	1.9-3.6	9.6630	(165)	32.08		1.9-3.6	7.3287	(317)	
	3.7-5.4	--	--	--		3.7-5.4	-11.0000	(3)	
5	0-1.8	15.7172	(64)	22.46	5	0-1.8	20.0469	(49)	
	1.9-3.6	9.0566	(189)	51.70		1.9-3.6	4.2184	(185)	
	3.7-5.4	--	--	--		3.7-5.4	11.1875	(16)	
6	0-1.8	31.3000	(2)	28.56	6	0-1.8	18.4333	(30)	
	1.9-3.6	5.8031	(195)	51.70		1.9-3.6	6.8901	(161)	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
7	0-1.8	--	--	--	7	0-1.8	6.3000	(1)	
	1.9-3.6	10.3953	(27)	24.82		1.9-3.6	7.8000	(5)	
	3.7-5.4	14.0000	(9)	18.20		3.7-5.4	--	--	
8-9	0-1.8	--	--	--	8-9	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	19.0000	(13)	13.95		3.7-5.4	--	--	
10-12	0-1.8	--	--	--	10-12	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
1-12	ALL TIMES	9.0408	(995)	35.39	1-12	ALL TIMES	7.7321	(1395)	

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

TABLE 11-2-R

READING MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	READING PROGRAM: PRESENTATION # 2			GRADE	READING AS PART OF READING-MATH PROGRAM: PRESENTATION # 2 ^a	
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)
1	0-1.8	--	--	1	0-1.8	--
	1.9-3.6	22.0000	(3) 22.72		1.9-3.6	--
	3.7-5.4	--	--		3.7-5.4	--
2	0-1.8	14.0000	(3) 58.43	2	0-1.8	-1.9600 (8)
	1.9-3.6	10.3684	(155) 40.22		1.9-3.6	10.9700 (10)
	3.7-5.4	8.9091	(11) 41.75		3.7-5.4	18.0000 (3)
3	0-1.8	0.2188	(16) 2472.52	3	0-1.8	7.0533 (15)
	1.9-3.6	9.0279	(161) 46.86		1.9-3.6	-0.3000 (6)
	3.7-5.4	12.6000	(5) 29.52		3.7-5.4	--
4	0-1.8	8.3545	(11) 83.09	4	0-1.8	11.0745 (17)
	1.9-3.6	4.5188	(101) 101.35		1.9-3.6	6.9737 (38)
	3.7-5.4	4.5000	(6) 82.67		3.7-5.4	15.6222 (9)
5	0-1.8	19.2867	(12) 50.36	5	0-1.8	16.4000 (16)
	1.9-3.6	8.6051	(79) 39.16		1.9-3.6	0.3933 (15)
	3.7-5.4	15.7333	(9) 23.65		3.7-5.4	5.4833 (24)
6	0-1.8	18.1000	(5) 68.40	6	0-1.8	10.2000 (15)
	1.9-3.6	8.3348	(46) 32.63		1.9-3.6	5.1583 (12)
	3.7-5.4	--	--		3.7-5.4	--
7	0-1.8	--	--	7	0-1.8	32.2000 (1)
	1.9-3.6	15.1975	(81) 13.62		1.9-3.6	--
	3.7-5.4	3.5000	(5) 105.71		3.7-5.4	--
8-9	0-1.8	--	--	8-9	0-1.8	--
	1.9-3.6	--	--		1.9-3.6	--
	3.7-5.4	7.2000	(10) 51.39		3.7-5.4	--
10-12	0-1.8	--	--	10-12	0-1.8	--
	1.9-3.6	--	--		1.9-3.6	--
	3.7-5.4	--	--		3.7-5.4	--
1-12	ALL TIMES	9.3649	(719) 43.03	1-12	ALL TIMES	7.9164 (189)

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

to \$52.72 per student per NCE gain. For math as a part of a larger math-reading program, the same time category provided most of the non-suspect data. Here the range in NCE gains was 4.2184 to 9.9523. Overall the gains in NCEs was 9.0408 for the math program only and 7.7321 for math in a joint program with reading. Cost for the math program only was \$35.39 per student per NCE gain.

Presentation procedure 2 for reading (Table 11-2-R) produced data very similar to that presented in Table 11-2-M. That is, the data in which one may have confidence (the non-suspect) was limited to the 1.9-3.6 hours of instruction per week. Such non-suspect data was found in the reading program only. The range of the data was from 4.5188 to 15.1975 mean NCE gains with a cost from \$13.62 to \$101.35 per student per NCE. The overall NCE gain was 9.3649 with a mean cost of \$43.03 per student per NCE. Gain across all grades and times for reading when a part of a combination reading-math program was 7.9164 NCEs.

N-counts for all grade levels and all time categories in Table 11-3-M were too small for discussion of results by these variables. Across all grades and times a 5.0866 NCE mean gain was recorded for 82 students in math programs where math was a part of a math-reading program. The 8.2508 NCE mean gain for the math program only was suspect due to the small n-count (24).

Very limited change data at a non-suspect level was produced in reading programs in presentation procedure 3 (Table 11-3-R). Such data as was produced was limited to time periods of 1.9-3.6 and 3.7-5.4 hours per week. The range of NCE gain for students receiving instruction was 6.5442 to 12.7687 (for 1.9-3.6 hours) and 2.9722 to 3.3361 (for 3.7-5.4 hours). Cost for the former time was \$16.92 to \$62.70 with \$53.35 to

TABLE 11-3-M

MATH MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	MATH PROGRAM: PRESENTATION # 3			GRADE	MATH AS A PART OF MATH-READING PROGRAM: PRESENTATION # 3		
	Time: Hrs./Wk.	Mean NCE Gains & (N)	Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains & (N)	
1	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	1	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
2	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	2	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
3	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	3	0-1.8 1.9-3.6 3.7-5.4	11.2692 --	(12) --
4	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	4	0-1.8 1.9-3.6 3.7-5.4	4.8727 --	(11) --
5	0-1.8 1.9-3.6 3.7-5.4	-1.5000 -- --	(2) -- --	5	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
6	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	6	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
7	0-1.8 1.9-3.6 3.7-5.4	-- -- 23.8375	-- -- (8) 19.17	7	0-1.8 1.9-3.6 3.7-5.4	4.4017 --	(23) --
8-9	0-1.8 1.9-3.6 3.7-5.4	-- -- 1.2000	-- -- (14) 161.67	8-9	0-1.8 1.9-3.6 3.7-5.4	3.3029 --	(35) --
10-12	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	10-12	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
1-12	ALL TIMES	8.5208 --	(24) 36.03	1-12	ALL TIMES	5.0866 --	(82)

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

^cMean Gain Score was negative.

TABLE 11-3-R

READING MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	READING PROGRAM: PRESENTATION # 3				GRADE	READING AS A PART OF READING-MATH PROGRAM: PRESENTATION # 3 ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8	--	--	--	1	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
2	0-1.8	--	--	--	2	0-1.8	--	--
	1.9-3.6	12.7687	(208)	16.92		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
3	0-1.8	--	--	--	3	0-1.8	--	--
	1.9-3.6	9.7344	(192)	22.19		1.9-3.6	1.6308	(13)
	3.7-5.4	6.0696	(23)	36.98		3.7-5.4	--	--
4	0-1.8	--	--	--	4	0-1.8	--	--
	1.9-3.6	9.5613	(173)	62.70		1.9-3.6	1.0000	(11)
	3.7-5.4	3.4452	(42)	88.53		3.7-5.4	-6.2000	(3)
5	0-1.8	--	--	--	5	0-1.8	--	--
	1.9-3.6	8.7619	(197)	19.19		1.9-3.6	--	--
	3.7-5.4	12.5059	(34)	20.95		3.7-5.4	11.5000	(3)
6	0-1.8	--	--	--	6	0-1.8	--	--
	1.9-3.6	6.5442	(206)	39.42		1.9-3.6	--	--
	3.7-5.4	5.1136	(44)	49.67		3.7-5.4	--	--
7	0-1.8	--	--	--	7	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	4.6318	(22)
	3.7-5.4	2.9722	(90)	76.37		3.7-5.4	20.4000	(1)
8-9	0-1.8	--	--	--	8-9	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	3.3361	(122)	53.35		3.7-5.4	6.5314	(35)
10-12	0-1.8	--	--	--	10-12	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
1-12	ALL TIMES	8.1748	(1331)	28.01	1-12	ALL TIMES	4.5341	(88)

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

\$76.37 for the latter time. Overall mean gains for the reading program only was 8.1748 NCEs, while the mean gain for reading as a part of reading-math programs was 4.5341 NCEs.

The array of data provided in Tables 11-4-M and 11-4-R was largely suspect when presentation procedure 4 was used; that is, most data were based on relatively small n-counts--fewer than 50 students.

In the math program only, presentation 4, non-suspect data was reported for grades 4, 5, and 6 with an instructional time of 1.9-3.6 hours per week. Within this limited scope, the NCE mean student gain was 2.1404 to 8.8042 with corresponding costs of \$36.69 to \$147.64 per NCE gain per student.

In those math programs that were a part of a combined math-reading program, non-suspect data was reported at grades 2 through 6 with an instructional time of 1.9-3.6 hours. Here the range of student gain was 6.3529 to 11.1561 NCEs. At grades 4 and 5 with instruction of 0 to 1.8 hours the gain was 4.6220 and 6.1360 NCEs, respectively (Table 11-4-M).

Across all times and all grades the math programs only produced a student gain of 5.2791 NCEs at a cost of \$60.62 per NCE per student. This student gain was 6.7790 NCEs for math when it was a part of a joint math-reading program (Table 11-4-M).

In the reading program only, presentation 4, non-suspect data was most prevalent at grades 2 through 6 (Table 11-4-R). For a time of 0-1.8 hours per week of instruction, the change in NCE mean gain per student was 4.2839 to 10.4929. For a time of 1.9-3.6 hours the change was 1.8322 to 6.0305 NCEs, and for a time of 3.7 to 5.4 hours the change was 0.6789 to 3.5093 NCEs. The cost per unit gain for the expenditure of instructional time was \$28.21 to \$67.70, \$30.51 to \$216.68, and \$94.89 to

TABLE 11-4-M

MATH MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	MATH PROGRAM: PRESENTATION # 4				GRADE	MATH AS A PART OF MATH-READING PROGRAM: PRESENTATION # 4 ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8	--	--	--	1	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
2	0-1.8	2.2500	(2)	107.84	2	0-1.8	10.3729	(7)
	1.9-3.6	-2.0467	(3)	c		1.9-3.6	11.1561	(66)
	3.7-5.4	--	--	--		3.7-5.4	--	--
3	0-1.8	--	--	--	3	0-1.8	-7.5714	(14)
	1.9-3.6	-12.9389	(10)	c		1.9-3.6	7.2513	(111)
	3.7-5.4	--	--	--		3.7-5.4	--	--
4	0-1.8	--	--	--	4	0-1.8	6.1360	(189)
	1.9-3.6	8.8042	(259)	36.69		1.9-3.6	8.6062	(96)
	3.7-5.4	--	--	--		3.7-5.4	9.3286	(14)
5	0-1.8	18.1000	(1)	13.76	5	0-1.8	4.6220	(50)
	1.9-3.6	7.1771	(550)	44.45		1.9-3.6	6.6613	(155)
	3.7-5.4	--	--	--		3.7-5.4	--	--
6	0-1.8	--	--	--	6	0-1.8	-0.2583	(12)
	1.9-3.6	2.1404	(539)	147.64		1.9-3.6	6.3529	(51)
	3.7-5.4	--	--	--		3.7-5.4	--	--
7	0-1.8	--	--	--	7	0-1.8	3.6000	(8)
	1.9-3.6	8.2364	(22)	45.83		1.9-3.6	5.7846	(13)
	3.7-5.4	9.9833	(6)	49.58		3.7-5.4	-2.4000	(6)
8-9	0-1.8	--	--	--	8-9	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	16.4500	(4)	30.09		3.7-5.4	15.3000	(7)
10-12	0-1.8	--	--	--	10-12	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
1-12	ALL TIMES	5.2791	(1404)	60.62	1-12	ALL TIMES	6.7790	(796)

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.^bMean gain scores are stated in NCEs (Normal Curve Equivalents).^cMean Gain Score was negative.

TABLE 11-4-R

READING MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	READING PROGRAM: PRESENTATION # 4			GRADE	READING AS A PART OF READING-MATH PROGRAM: PRESENTATION # 4 ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8	--	--	1	0-1.8	--	--
	1.9-3.6	--	--		1.9-3.6	--	--
	3.7-5.4	--	--		3.7-5.4	--	--
2	0-1.8	5.9995 (194)	46.84	2	0-1.8	--	--
	1.9-3.6	5.0892 (715)	93.53		1.9-3.6	6.7953	(236)
	3.7-5.4	0.6789 (54)	461.03		3.7-5.4	--	--
3	0-1.8	4.2839 (274)	67.70	3	0-1.8	--	--
	1.9-3.6	1.8322 (972)	216.68		1.9-3.6	3.1012	(245)
	3.7-5.4	3.5093 (54)	94.89		3.7-5.4	--	--
4	0-1.8	10.4929 (210)	28.21	4	0-1.8	--	--
	1.9-3.6	2.8458 (957)	134.58		1.9-3.6	3.0824	(250)
	3.7-5.4	4.8303 (33)	67.49		3.7-5.4	2.0125 (16)	
5	0-1.8	6.4509 (275)	44.18	5	0-1.8	-0.5000 (2)	
	1.9-3.6	5.5353 (490)	84.91		1.9-3.6	4.4220	(254)
	3.7-5.4	2.7120 (25)	117.99		3.7-5.4	--	--
6	0-1.8	6.5862 (224)	47.22	6	0-1.8	-1.0333 (3)	
	1.9-3.6	3.2852 (399)	111.41		1.9-3.6	6.3280	(118)
	3.7-5.4	--	--		3.7-5.4	--	--
7	0-1.8	9.9937 (48)	23.01	7	0-1.8	--	--
	1.9-3.6	7.9896 (461)	40.17		1.9-3.6	15.5176 (17)	
	3.7-5.4	4.4421 (19)	86.90		3.7-5.4	13.3000 (6)	
8-9	0-1.8	6.1674 (46)	33.07	8-9	0-1.8	--	--
	1.9-3.6	5.6080 (113)	61.34		1.9-3.6	--	--
	3.7-5.4	-0.4786 (20)	c		3.7-5.4	8.1857 (7)	
10-12	0-1.8	--	--	10-12	0-1.8	--	--
	1.9-3.6	6.0305 (95)	30.51		1.9-3.6	--	--
	3.7-5.4	--	--		3.7-5.4	--	--
1-12	ALL TIMES	4.5959 (5686)	79.64	1-12	ALL TIMES	4.7080	(1154)

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

^cMean Gain Score was negative.

\$461.03, respectively.

Fewer instructional time periods were used in reading programs which were a part of a joint program. As a result, non-suspect data was produced only at the 1.9-3.6 hour period. The change for this time period was 3.0824 to 6.7953 NCEs per student (mean gain).

The summation across all times and grades showed a gain of 4.5959 NCEs at a cost of \$79.64 per student per NCE in the reading program only. When reading instruction was part of a joint program the change was 4.7080 NCEs per student (mean gain).

Table 11-5-M and 11-5-R indicate that a relatively small number of students (statewide) participated in a Title I program which used presentation procedure 5. This procedure removed students from the regular classroom in groups of 10 or more to participate in special Title I funded classes or laboratory activities conducted by a teacher and an aide.

In the math program only, 136 students participated statewide. This produced a mean gain of 8.9868 NCEs at a cost of \$36.16 per student per NCE. N-counts by time categories were too small for confidence in other reported NCE changes (Table 11-5-M).

In the math program as a part of a joint instructional effort, 298 students participated statewide. These students' average improvement was 8.6017 NCEs.

Table 11-5-R shows larger numbers of students involved in reading programs which used presentation 5. Reading programs only produced mean gains of 5.1311 to 11.1653 and 0.3048 to 4.0133 NCEs for instructional times of 1.9-3.6 hours and 3.7 to 5.4 hours. Program costs were \$31.88 to \$80.09 and \$112.52 to \$1,492.78 per student per NCE, respectively. Only one time period, 1.9-3.6 hours, had non-suspect data reported when

TABLE 11-5-M

MATH MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	MATH PROGRAM: PRESENTATION # 5			GRADE	MATH AS A PART OF MATH-READING PROGRAM: PRESENTATION # 5 ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	1	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
2	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	2	0-1.8 1.9-3.6 3.7-5.4	17.9582 -- --	(98) -- --
3	0-1.8 1.9-3.6 3.7-5.4	-- 9.7154 --	-- (13) --	3	0-1.8 1.9-3.6 3.7-5.4	4.6299 -- --	(117) -- --
4	0-1.8 1.9-3.6 3.7-5.4	-- 10.7340 --	-- (47) --	4	0-1.8 1.9-3.6 3.7-5.4	1.3208 7.0333 --	(43) (4) --
5	0-1.8 1.9-3.6 3.7-5.4	-- 7.5905 --	-- (42) --	5	0-1.8 1.9-3.6 3.7-5.4	-5.4000 13.1077 --	(16) (13) --
6	0-1.8 1.9-3.6 3.7-5.4	-- 5.7421 --	-- (19) --	6	0-1.8 1.9-3.6 3.7-5.4	22.7000 -- --	(2) -- --
7	0-1.8 1.9-3.6 3.7-5.4	10.9000 -- --	(15) -- --	7	0-1.8 1.9-3.6 3.7-5.4	11.1000 -- --	(3) -- --
8-9	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	8-9	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
10-12	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	10-12	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
1-12	ALL TIMES	8.9868 (136)	36.16	1-12	ALL TIMES	8.6017 (298)	

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

TABLE 11-5-R

READING MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	READING PROGRAM: PRESENTATION # 5				GRADE	READING AS A PART OF READING-MATH PROGRAM: PRESENTATION # 5 ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8	--	--	--	1	0-1.8	--	--
	1.9-3.6	--	--	--		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
2	0-1.8	--	--	--	2	0-1.8	--	--
	1.9-3.6	11.1653	(337)	31.88		1.9-3.6	15.2973	(110)
	3.7-5.4	4.0133	(83)	113.62		3.7-5.4	--	--
3	0-1.8	--	--	--	3	0-1.8	--	--
	1.9-3.6	6.8870	(238)	48.64		1.9-3.6	8.4119	(160)
	3.7-5.4	2.3133	(83)	198.42		3.7-5.4	-3.8077	(26)
4	0-1.8	--	--	--	4	0-1.8	--	--
	1.9-3.6	7.2279	(319)	54.37		1.9-3.6	6.2961	(77)
	3.7-5.4	0.3048	(83)	1492.78		3.7-5.4	4.9286	(63)
5	0-1.8	--	--	--	5	0-1.8	--	--
	1.9-3.6	6.0110	(429)	68.37		1.9-3.6	3.5486	(111)
	3.7-5.4	7.5000	(3)	62.67		3.7-5.4	4.9000	(9)
6	0-1.8	--	--	--	6	0-1.8	--	--
	1.9-3.6	5.1311	(427)	80.09		1.9-3.6	1.0729	(96)
	3.7-5.4	5.8326	(43)	29.49		3.7-5.4	--	--
7	0-1.8	--	--	--	7	0-1.8	--	--
	1.9-3.6	5.7588	(153)	61.30		1.9-3.6	-3.6000	(3)
	3.7-5.4	3.2615	(78)	112.52		3.7-5.4	--	--
8-9	0-1.8	--	--	--	8-9	0-1.8	--	--
	1.9-3.6	7.1008	(247)	37.60		1.9-3.6	-5.1000	(5)
	3.7-5.4	5.7897	(29)	63.04		3.7-5.4	--	--
10-12	0-1.8	--	--	--	10-12	0-1.8	--	--
	1.9-3.6	7.6936	(47)	8.84		1.9-3.6	--	--
	3.7-5.4	--	--	--		3.7-5.4	--	--
1-12	ALL TIMES	6.4332	(2599)	57.5 ^c	1-12	ALL TIMES	6.4548	(660)

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

reading was a part of a joint program. This time spent in instruction produced NCE mean gains per student of 1.0729 to 15.2973.

Reading programs (statewide) using presentation 5, had 2,599 students in the reading program only and 660 in reading programs operated jointly with math. In the former, the mean student gain was 6.4332 NCEs, and in the latter the mean student gain was 6.4548 NCEs. The 6.4332 NCE mean gain was accomplished at a per student per unit cost of \$57.51.

Tables 11-6-M and 11-6-R provides data which resulted from math and reading program activities in accordance with presentation procedure 6. Presentation procedure 6 removed students from their regular classrooms in groups of less than ten to participate in Title I funded math or reading activities which were conducted by a teacher and an aide.

When suspect data was removed from the data shown in Table 11-6-M (math program only) only one time category at two grades remained. Presentation 6 activities at grade 4 and 5 with an instructional time per week of 1.9-3.6 hours produced mean gains per student of 15.5326 and 8.6000 NCEs, respectively. The costs per student per NCE gain was \$24.46 (grade 4) and \$51.98 (grade 5). Math as a part of a combined math-reading program produced non-suspect data at the same grades and same time category. The increases in mean NCEs per student were 16.8375 (grade 4) and 3.2013 (grade 5).

Across all grades and time categories, presentation 6 increased mean student NCE gain by 13.7902 (math program only) and 8.9559 (math program in conjunction with math-reading program). The 13.7902 NCEs were gained at a mean cost of \$27.08 per student per NCE (Table 11-6-M).

Removal of suspect data from Table 11-6-R left data in two time categories at some of the grades from 2 through 9 (reading program only).

TABLE 11-6-M

MATH MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	MATH PROGRAM: PRESENTATION # 6			GRADE	MATH AS A PART OF MATH-READING PROGRAM: PRESENTATION # 6 ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8	--	--	1	0-1.8	--	--
	1.9-3.6	--	--		1.9-3.6	--	--
	3.7-5.4	--	--		3.7-5.4	--	--
2	0-1.8	--	--	2	0-1.8	27.5380	(41)
	1.9-3.6	13.8568	(37)		1.9-3.6	16.7943	(35)
	3.7-5.4	-5.2667	(3) ^c		3.7-5.4	--	--
3	0-1.8	--	--	3	0-1.8	3.6844	(32)
	1.9-3.6	17.8630	(46)		1.9-3.6	0.5245	(49)
	3.7-5.4	--	--		3.7-5.4	6.5786	(14)
4	0-1.8	--	--	4	0-1.8	0.1609	(23)
	1.9-3.6	15.5326	(185)		1.9-3.6	16.8375	(72)
	3.7-5.4	13.6000	(3)		3.7-5.4	--	--
5	0-1.8	--	--	5	0-1.8	2.9333	(6)
	1.9-3.6	8.6000	(56)		1.9-3.6	3.2013	(76)
	3.7-5.4	7.6000	(1)		3.7-5.4	19.0000	(1)
6	0-1.8	--	--	6	0-1.8	-9.8200	(5)
	1.9-3.6	9.6738	(42)		1.9-3.6	4.4979	(48)
	3.7-5.4	18.9000	(3)		3.7-5.4	5.2000	(4)
7	0-1.8	--	--	7	0-1.8	--	--
	1.9-3.6	--	--		1.9-3.6	--	--
	3.7-5.4	--	--		3.7-5.4	--	--
8-9	0-1.8	--	--	8-9	0-1.8	--	--
	1.9-3.6	--	--		1.9-3.6	--	--
	3.7-5.4	--	--		3.7-5.4	--	--
10-12	0-1.8	--	--	10-12	0-1.8	--	--
	1.9-3.6	--	--		1.9-3.6	--	--
	3.7-5.4	--	--		3.7-5.4	--	--
1-12	ALL TIMES	13.7902	(376)	1-12	ALL TIMES	8.9559	(406)

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

^cMean Gain Score was negative.

TABLE 11-6-R

READING MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	READING PROGRAM: PRESENTATION # 6				GRADE	READING AS A PART OF READING-MATH PROGRAM: PRESENTATION # 6 ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8 1.9-3.6 3.7-5.4	--	--	--	1	0-1.8 1.9-3.6 3.7-5.4	--	--
2	0-1.8 1.9-3.6 3.7-5.4	9.7337 7.6467 26.1529	(89) (439) (17)	33.90 60.68 15.03	2	0-1.8 1.9-3.6 3.7-5.4	-- 9.3568 -7.9455	-- (139) (11)
3	0-1.8 1.9-3.6 3.7-5.4	-- 4.6703 6.4200	-- (455) (15)	-- 92.07 59.03	3	0-1.8 1.9-3.6 3.7-5.4	-- 4.3810 0.3083	-- (189) (12)
4	0-1.8 1.9-3.6 3.7-5.4	-- 7.2314 7.3214	-- (780) (28)	-- 60.98 54.91	4	0-1.8 1.9-3.6 3.7-5.4	-- 3.1313 2.8825	-- (182) (40)
5	0-1.8 1.9-3.6 3.7-5.4	-4.6937 4.2957 10.4360	(16) (510) (25)	^c 99.16 36.51	5	0-1.8 1.9-3.6 3.7-5.4	-- 5.2097 4.8571	-- (216) (14)
6	0-1.8 1.9-3.6 3.7-5.4	7.2833 3.3380 11.4667	(54) (392) (3)	45.31 134.21 40.03	6	0-1.8 1.9-3.6 3.7-5.4	-2.7000 5.3714 0.7308	(5) (133) (13)
7	0-1.8 1.9-3.6 3.7-5.4	-- 5.9703 4.0727	-- (37) (44)	-- 92.96 92.57	7	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
8-9	0-1.8 1.9-3.6 3.7-5.4	-- 1.5161 --	-- (56) --	-- 232.17 --	8-9	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
10-12	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	-- -- --	10-12	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
1-12	ALL TIMES	5.8555	(2960)	73.95	1-12	ALL TIMES	4.8572	(954)

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents)

^cMean Gain Score was negative.

Reading as a part of reading-math programs has non-suspect data at one time category in grades 2 through 6. NCE mean gains per student were 7.2833 and 9.7337 at a cost of \$60.98 and \$33.90 per student per NCE for time categories of 0-1.8 hours (reading program only). For the same program at a time category of 1.9-3.6 hours per week, the mean gains ranged from 1.5161 to 7.6467 NCEs at a cost of \$60.68 to \$134.21 per student per NCE gained. The non-suspect data in the reading program, where it was a part of reading-math programs, showed NCE mean gains of 3.1313 to 9.3568 per student.

NCE mean gains across all grades and times were 5.8555 and 4.8572 NCEs for the reading program only and the reading program in conjunction with reading-math program. The 5.8555 NCEs were gained at a cost of \$73.95 per student per NCE gained.

Student change due to presentation procedure 7 is provided in Tables 11-7-M and 11-7-R. Presentation procedure 7 utilized a Title I aide to provide services to eligible students in the regular classroom.

All math programs using presentation 7 produced non-suspect outcomes (NCE gains) only for a single instructional time category, 1.9-3.6 hours per week. For the math program only, NCE mean gains ranged from 2.2111 to 10.0698 at a cost of \$36.94 to \$168.24 per student per NCE. When math programs were a part of math-reading programs, NCE mean gains ranged from 3.7770 to 4.5448 per student (Table 11-7-M).

Across all grades and all times (Table 11-7-M), the math program only produced a mean NCE gain of 6.5385 per student, while the math program in conjunction with a math-reading program produced a mean NCE gain of 5.4284 per student. The cost of the former mean gain was \$57.51 per unit (NCE).

TABLE 11-7-M

MATH MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	MATH PROGRAM: PRESENTATION # 7			GRADE	MATH AS A PART OF MATH-READING PROGRAM: PRESENTATION # 7 ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	1	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
2	0-1.8 1.9-3.6 3.7-5.4	-- 8.6212 (33) --	-- 43.15 --	2	0-1.8 1.9-3.6 3.7-5.4	22.8000 (8) -- 13.1912 (34)	-- -- --
3	0-1.8 1.9-3.6 3.7-5.4	-- 10.1245 (49) --	-- 36.74 --	3	0-1.8 1.9-3.6 3.7-5.4	-15.2000 (2) 3.9564 (55) --	-- -- --
4	0-1.8 1.9-3.6 3.7-5.4	-- 0.7209 (43) --	-- 516.02 --	4	0-1.8 1.9-3.6 3.7-5.4	7.7000 (7) 4.5448 (87) --	-- -- --
5	0-1.8 1.9-3.6 3.7-5.4	-- 10.0698 (53) --	-- 36.94 --	5	0-1.8 1.9-3.6 3.7-5.4	16.3000 (6) 2.5000 (2) --	-- -- --
6	0-1.8 1.9-3.6 3.7-5.4	-- 2.2111 (54) --	-- 168.24 --	6	0-1.8 1.9-3.6 3.7-5.4	-11.5000 (8) 3.7770 (87) --	-- -- --
7	0-1.8 1.9-3.6 3.7-5.4	-- 14.000 (7) --	-- 35.36 --	7	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
8-9	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	8-9	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
10-12	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	10-12	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
1-12	ALL TIMES	6.5385 (239)	57.51	1-12	ALL TIMES	5.4284 (296)	

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

TABLE 11-7-R

READING MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	READING PROGRAM: PRESENTATION # 7			GRADE	READING AS A PART OF READING-MATH PROGRAM: PRESENTATION # 7 ^a		
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)	
1	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	1	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
2	0-1.8 1.9-3.6 3.7-5.4	6.1349 (43) 9.6214 (70) 2.3857 (7)	62.27 45.21 79.64	2	0-1.8 1.9-3.6 3.7-5.4	1.9000 (8) 10.0286 (14) -6.0200 (5)	
3	0-1.8 1.9-3.6 3.7-5.4	7.6643 (56) 1.8743 (70) 55.4000 (1)	49.84 237.42 5.67	3	0-1.8 1.9-3.6 3.7-5.4	-11.8000 (10) -9.9800 (30) 22.9000 (2)	
4	0-1.8 1.9-3.6 3.7-5.4	-- 5.4043 (47) 7.0000 (1)	-- 34.42 44.86	4	0-1.8 1.9-3.6 3.7-5.4	26.5000 (4) -- 2.9094 (32)	
5	0-1.8 1.9-3.6 3.7-5.4	-- 1.7485 (33) --	-- 175.58 --	5	0-1.8 1.9-3.6 3.7-5.4	7.5000 (6) 7.0838 (37) -4.1000 (3)	
6	0-1.8 1.9-3.6 3.7-5.4	-- 1.1957 (47) 1.3824 (17)	-- 114.58 269.82	6	0-1.8 1.9-3.6 3.7-5.4	6.6000 (9) -0.3886 (44) --	
7	0-1.8 1.9-3.6 3.7-5.4	-- 18.7428 (7) --	-- 26.41 --	7	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
8-9	0-1.8 1.9-3.6 3.7-5.4	-- 5.4500 (4) --	-- 90.83 --	8-9	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
10-12	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --	10-12	0-1.8 1.9-3.6 3.7-5.4	-- -- --	-- -- --
1-12	ALL TIMES	5.2635 (403)	65.17	1-12	ALL TIMES	1.4149 (201)	

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

When considering all reading programs using presentation procedure 7 only three pieces of output data were non-suspect (other than program totals). This data was at grades 2 and 3 in the program classified as reading program only. At grade 2, an NCE mean gain of 9.6214 at a cost of \$45.21 per student per unit gain was produced when the instructional time was 1.9 to 3.6 hours per week. For the same time category at grade 3 the mean gain was 1.8743 NCEs at a cost of \$237.42 per student per unit gain. Also, at grade 3 a mean gain of 7.6643 NCEs (cost \$49.84 per student per unit gain) was produced when the instructional time was 0-1.8 hours per week.

Across all grades and times the mean gain scores for the reading program only was 5.2635 NCEs at a cost of \$65.17 per student per unit gain. The mean gain was 1.4149 NCEs for the reading program when it was a part of a joint reading-math instructional program.

Cell data in Tables 11-8-M and 11-8-R show the effect of presentation procedure 8 on the math and reading achievement of those Title I students participating in the associated activities. Procedure 8 was any method of instruction which was not one of the first seven procedures (see page 16).

N-counts for students enrolled in special Title I math programs were too small to provide non-suspect data for both the math program only and the math program as a part of a joint math-reading program, except for the total across all grades and time categories for the latter program. For this program the mean NCE gain per student was 0.1228 (Table 11-9-M).

Generally, the n-counts for the data provided in the (Table 11-8-R), based on grade and time spent in instruction using procedure 8, were not

TABLE 11-8-M

MATH MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	MATH PROGRAM: PRESENTATION # 8				GRADE	MATH AS A PART OF MATH-READING PROGRAM: PRESENTATION # 8 ^a			
	Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b & (N)		
1	0-1.8	--	--	--	1	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
2	0-1.8	--	--	--	2	0-1.8	--	--	
	1.9-3.6	9.7909	(11)	46.57		1.9-3.6	9.2000	(3)	
	3.7-5.4	--	--	--		3.7-5.4	-0.0167	(6)	
3	0-1.8	--	--	--	3	0-1.8	--	--	
	1.9-3.6	11.1000	(1)	41.08		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	3.5640	(25)	
4	0-1.8	--	--	--	4	0-1.8	--	--	
	1.9-3.6	6.4000	(1)	71.25		1.9-3.6	-10.8250	(8)	
	3.7-5.4	16.7000	(1)	27.31		3.7-5.4	-3.0905	(21)	
5	0-1.8	--	--	--	5	0-1.8	--	--	
	1.9-3.6	-3.8000	(5)	c		1.9-3.6	--	--	
	3.7-5.4	-6.2500	(4)	c		3.7-5.4	1.9875	(24)	
6	0-1.8	--	--	--	6	0-1.8	--	--	
	1.9-3.6	16.8000	(1)	27.14		1.9-3.6	--	--	
	3.7-5.4	2.0125	(8)	226.58		3.7-5.4	-0.3000	(5)	
7	0-1.8	--	--	--	7	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
8-9	0-1.8	--	--	--	8-9	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
10-12	0-1.8	--	--	--	10-12	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
1-12	ALL TIMES	1.2228	(92)		1-12	ALL TIMES	0.1228	(92)	

^aSeparate cost figures were not available for math programs when they were a part of a combined Math-Reading Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

^cMean Gain Score was negative.

TABLE 11-8-R

READING MEAN GAIN SCORES BY PRESENTATION,
BY SUBJECT, BY GRADE, AND BY TIME

GRADE	READING PROGRAM: PRESENTATION # 8				GRADE	READING AS A PART OF READING-MATH PROGRAM: PRESENTATION # 8 ^a			
	Time: Hrs./Wk.	Mean NCE Gains ^b (N)		Cost/ Stud/ NCE		Time: Hrs./Wk.	Mean NCE Gains ^b (N)		
1	0-1.8	--	--	--	1	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
2	0-1.8	24.5000	(1)	23.22	2	0-1.8	--	--	
	1.9-3.6	5.8500	(4)	47.17		1.9-3.6	23.1000	(5)	
	3.7-5.4	1.0867	(15)	436.46		3.7-5.4	-0.5000	(22)	
3	0-1.8	3.9500	(2)	144.05	3	0-1.8	--	--	
	1.9-3.6	1.5242	(99)	268.99		1.9-3.6	--	--	
	3.7-5.4	1.6500	(18)	292.12		3.7-5.4	5.0268	(56)	
4	0-1.8	--	--	--	4	0-1.8	--	--	
	1.9-3.6	8.3513	(74)	47.18		1.9-3.6	7.2000	(2)	
	3.7-5.4	2.2000	(7)	237.73		3.7-5.4	-2.2227	(22)	
5	0-1.8	--	--	--	5	0-1.8	--	--	
	1.9-3.6	0.2690	(29)	1457.25		1.9-3.6	-7.3000	(1)	
	3.7-5.4	9.4625	(8)	55.27		3.7-5.4	4.0679	(28)	
6	0-1.8	--	--	--	6	0-1.8	--	--	
	1.9-3.6	14.2500	(6)	13.54		1.9-3.6	--	--	
	3.7-5.4	7.2333	(3)	72.30		3.7-5.4	15.5371	(7)	
7	0-1.8	--	--	--	7	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
8-9	0-1.8	--	--	--	8-9	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
10-12	0-1.8	--	--	--	10-12	0-1.8	--	--	
	1.9-3.6	--	--	--		1.9-3.6	--	--	
	3.7-5.4	--	--	--		3.7-5.4	--	--	
1-12	ALL TIMES	4.0481	(266)	102.52	1-12	ALL TIMES	3.9650	(143)	

^aSeparate cost figures were not available for reading programs when they were a part of a combined Reading-Math Program.

^bMean gain scores are stated in NCEs (Normal Curve Equivalents).

large enough to be free of suspicion. Grades 3 and 4 for the reading program only with 1.0-3.6 hours of instruction per week produced mean gains of 1.5242 and 8.3513 NCEs, respectively. The costs were \$268.99 and \$47.18 per student per unit gained. Only one cell in the reading program as a part of a joint program shows a gain score based upon a large enough n-count to be non-suspect. This cell, grade 3 with an instruction time of 1.9 to 3.6 hours per week, showed a mean gain of 5.0268 NCEs.

Overall, mean gains were 4.0481 and 3.9650 NCEs for the reading program only and the reading program as a part of a joint program. The former mean gain cost \$102.52 per student per NCE.

The outcome of the ESEA Title I program, which has been presented in detail in this Section, is summarized with concluding statements and recommendations in Section IV.

IV. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This section was based on a careful review of the data and information presented in Section III. The purpose of the review was to: (1) summarize Title I impact relative to each broad question as originally stated by the state staff, (2) draw conclusions relative to each broad question; and (3) make recommendations to strengthen both the Title I programs and the data collection-reporting process in the future.

SUMMARY

Forty-five LEAs submitted fiscal year 1977-78 Title I impact data to the state staff in response to the new forms supplied in the ESEA Title I Evaluation Handbook. The completed forms provided the data which were necessary to answer the broad questions concerning Title I impact. In this subsection, the impact was summarized on the basis of the four broad questions that were stated prior to instrument development and data collection.

Question 1: How Many Students Participated in the Title I Program?

When discussing impact, one crucial piece of information is the number of students directly involved in the programs. The total unduplicated number of students was 28,645 from 45 of the 55 state LEAs. Students were concentrated at grades 1 through 6 with the number in each grade ranging from approximately 3,500 to 5,000 students. Very few participants were in grades 10, 11, and 12 (93, 39, and 40, respectively). And, relatively small numbers were in grade 7 (1,279), grade 8 (618),

and grade 9 (157). (See Table 1 on page 19.)

Data on the distribution of students among math and reading programs were limited to math programs only and reading programs only. The number of students in math-reading and reading-math programs (combination programs) was not collected. The number of students in reading programs was much greater than in the math programs. Reading programs had more than five times as many students as did the math programs (19,705 compared to 3,788). Students were concentrated most at grades 4 and 6 with a smaller concentration at grades 1 and 5. (See Table 2 on page 20.)

Question 2: How Many Participating Students Were Tested? Not all participating students were tested. And, not all students tested were measured with a pretest and a posttest (necessary for computation of gain scores). The data in Table 3 on page 21 represents students given both a pretest and a posttest. This total number was 25,135 with 6,582 in the math programs and 18,352 in the reading programs. More testing took place where there were more participants; that is, the concentration of tested students were in grades 2 through 6. Therefore, most of the discussion in the next subsection will be confined to these same grades, plus grade 7 in some instances.

Math testing was concentrated on those students in programs which removed them from the classroom with instruction offered either by an aide or a teacher. For those students, who were tested in reading, special instruction was provided either by a teacher or an aide and a teacher in a setting apart from the regular classroom.

Question 3: What Were the Mean Gain Scores in NCEs? Mean gain scores were calculated by subject and by subject in combination with a number of variables: grade, amount of instructional time, presentation,

and test date. In addition to the calculations by instructional program (math or reading), parallel calculations were presented for math and reading when they were a part of a combination program (math-reading or reading-math).

In Tables 4 through 10, the mean NCE gain scores by subject across all levels of the variables taken either one or two at a time indicated program gains as follows:

Math Program Only	7.7	Reading Program Only	5.7
Math as a Part of a Math-Reading Program	7.2	Reading as a Part of a Reading-Math Program	4.9

Some small variance in mean NCE gains was shown. (See Tables 4 through 10 on the following pages: 23-24, 29-30, 33-34, 35-36, 38-39, and 42-43.)

This variance was due to a small fluctuation in the n-count of different variable combinations.

A perusal of Tables 4-M, 5-M, 6-M, and 8-M (see pages 23, 26, 29, and 35) indicated the mean NCE gain scores for the non-suspect data in the math program only by grade (either singularly or in combination with a second variable) were as follows:

Grade 2	9.4 to 10.4	Grade 5	7.2 to 15.2
Grade 3	5.7 to 7.9	Grade 6	2.1 to 8.9
Grade 4	5.3 to 14.5		

In the same tables (designated with M in the table number), but with math as a part of a math-reading program the mean NCE gains were:

Grade 2	10.1 to 20.0	Grade 5	3.2 to 9.3
Grade 3	2.9 to 6.1	Grade 6	3.9 to 12.8
Grade 4	5.1 to 9.1		

A study of Tables 4-R, 5-R, 6-R, and 8-R, indicated the mean NCE gain scores (see pages 24, 27, 30, and 36) for the non-suspect data in

the reading program only by grade (either singularly or in combination with a second variable) were as follows:

Grade 2	5.0 to 14.5	Grade 5	4.3 to 9.6
Grade 3	1.6 to 9.4	Grade 6	3.7 to 7.1
Grade 4	3.7 to 8.7		

In the same tables (designated with R in the table number) but with reading as a part of a reading-math program the mean NCE gains were:

Grade 2	0.9 to 12.0	Grade 5	4.5 to 6.9
Grade 3	2.6 to 9.4	Grade 6	2.3 to 6.3
Grade 4	2.8 to 7.9		

The math program only by presentation (either singularly or in combination with a second variable) was shown to have the following mean NCE gains.

Presentation 2	3.7 to 14.3	Presentation 5	9.0 to 9.0
Presentation 3	--	Presentation 6	12.6 to 17.9
Presentation 4	3.7 to 9.0	Presentation 7	6.5 to 6.5

In the same tables but with math as a part of a math-reading program the mean NCE gains were as follows:

Presentation 2	5.9 to 16.1	Presentation 5	8.4 to 8.6
Presentation 3	5.1 to 5.1	Presentation 6	6.5 to 13.8
Presentation 4	5.0 to 8.1	Presentation 7	4.1 to 5.4

-- see Tables 7-M, 9-M, and 10-M on pages 33, 38 and 42.

The reading program only by presentation (either singularly or in combination with a second variable) was shown to have the following mean NCE gains:

Presentation 2	3.8 to 11.0	Presentation 5	3.1 to 11.4
Presentation 3	4.7 to 9.7	Presentation 6	4.3 to 9.2
Presentation 4	2.5 to 8.5	Presentation 7	4.8 to 7.0

In the same tables but with reading as a part of a reading-math program the mean NCE gains were as follows:

Presentation 2	5.4 to 10.2	Presentation 5	2.2 to 9.4
Presentation 3	4.5 to 4.5	Presentation 6	1.2 to 12.0
Presentation 4	4.5 to 5.0	Presentation 7	0.7 to 1.4

-- see Tables 7-R, 9-R, and 10-R on pages 34, 39, and 43.

Tables designated as 11 dealt with presentation procedures 1 through 8. These tables provided mean NCE gain scores by presentation procedure with the programs (math and reading) alternating and grade level and time categories remaining constant.

Tables designated as 11 which included the letter M dealt with math. These tables generally indicated a small number of students were tested at each presentation level with exceedingly small n-counts in many cells. These small n-counts were due to the division of the 6,582 students tested among 2 math programs and 8 presentation procedures which was followed by a further division into 27 positions by grade and time combinations. (This division of the students into smaller groups located in individual positions in the tables produced what may be called "cells".)

Across the eight presentation procedures in the math programs only at grade levels 2 through 6, the range of mean NCE gain scores by grade were as follows:

Grade 2	9.7 (2) ¹	(one cell) ²
Grade 3	6.2 (2)	(one cell)
Grade 4	8.8 (4) to 15.5 (6)	(three cells)
Grade 5	7.2 (4) to 15.7 (2)	(five cells)
Grade 6	2.1 (4) to 5.8 (2)	(three cells)

In the same tables but with math as a part of a math-reading program and considering the same variables the following mean NCE gains were produced:

¹Number in parenthesis indicated presentation procedure.

²Number of cells indicates how many cells were considered in the stated range at the specified grade.

Grade 2	10.0 (2)	to	18.0 (5)	(three cells)
Grade 3	4.0 (2)	to	7.3 (4)	(four cells)
Grade 4	4.5 (7)	to	16.8 (6)	(three cells)
Grade 5	3.2 (6)	to	20.0 (2)	(five cells)
Grade 6	3.7 (7)	to	6.9 (2)	(three cells)

-- see Tables 11-1-M through 11-8-M on pages 45, 47, 50, 56, 59, 62, and 65.

Across all grade levels, inclusive of all time categories, the mean NCE gain scores were from a low of 5.3 (presentation 4) to a high of 13.7 (presentation 6) for the math program only. Applying the same parameters to the math program as a part of a math-reading program produced a low of 0.1 (presentation 8) and a high of 9.0 (presentation 6).

In the reading program only at grade levels 2 through 7 across the 8 presentation procedures, the mean NCE gain scores by grade were as follows:

Grade 2	0.7 (4)	to	12.9 (3)	(11 cells)
Grade 3	1.5 (8)	to	9.6 (3)	(10 cells)
Grade 4	2.2 (1)	to	10.5 (4)	(10 cells)
Grade 5	3.3 (4)	to	8.8 (3)	(6 cells)
Grade 6	3.3 (5)	to	7.3 (6)	(4 cells)
Grade 7	3.0 (3)	to	15.2 (2)	(6 cells)

Reading program as a part of a reading-math program produced the following at the same grade levels across all presentations.

Grade 2	6.8 (4)	to	15.3 (6)	(3 cells)
Grade 3	3.1 (4)	to	8.4 (5)	(4 cells)
Grade 4	3.1 (4)	to	6.3 (5)	(4 cells)
Grade 5	3.5 (5)	to	5.2 (6)	(3 cells)
Grade 6	1.1 (5)	to	6.3 (6)	(2 cells)
Grade 7	--		--	(0 cells)

-- see Tables 11-1-R through 11-8-R on pages 46, 48, 51, 54, 60, 63, and 66.

Across all grade levels, including all time levels, the mean NCE gain scores were from a low of 4.0 (presentation 8) to a high of 9.4 (presentation 2) for the reading program only. These same parameters applied to the reading program as a part of a reading-math program

produced a low of 0.6 (presentation 1) and a high of 7.9 (presentation 2).

Question 4: What Was the Cost of the Title I Program? The average cost per student per NCE gain for math programs only (across all grades) was about \$43.00. For the reading program only, the cost was about \$64.00. (See Tables 4, 5, 6, and 8--both M and R designations--on the following pages: 23-24, 26-27, 29-30, and 35-36.) Likewise, when the math program only across all presentations was considered, the cost per student per NCE gain was about \$43.00. And, for the reading program only, the cost was about \$64.00. (See Tables 7, 9, and 10--both M and R designations--on the following pages: 33-34, 38-39, and 42-43.)

Cost per student per NCE of gain by presentation procedure across all grades was as follows:

<u>Reading Program Only</u>		<u>Math Program Only</u>	
Presentation	Cost	Presentation	Cost
1	\$ 73.42	1	\$ 28.11 ³
2	43.03	2	35.39
3	28.01	3	36.03 ³
4	79.64	4	60.62
5	57.51	5	36.16
6	73.95	6	27.78
7	65.17	7	57.51
8	102.52	8	111.56 ³

-- see Tables designated as 11 on the following pages: 45-46, 47-48, 50-51, 56-57, 59-60, 62-63, and 65-66.

CONCLUSIONS

In concert with the questions which were stated in Section III, the concluding remarks will be focused on the author's findings with regard

³ Cost figure is based on an n-count of less than 50; that is it is based on suspect data.

to each of the four questions.

Question 1: How Many Students Participated in the Title I Program?

ESEA Title I programs served student needs in math and reading. Special instruction was received by students in math only, reading only, math and reading together and reading and math together.

In fiscal year 1977-78, LEAs had the option of using the old or new format for reporting data. Forty-five LEAs selected the new format which involved the use of RMC's Model A (the norm-referenced model). The total number of involved students was 28,645.

ESEA Title I students -- in the 45 reporting LEAs -- were concentrated in grades 1 through 6 with fewer students at grades 7, 8, and 9. At grades 10, 11, and 12, the number of students participating was too small to draw conclusions from the data.

The 45 LEA's utilized Title I funds approximately five times as often for reading instruction as for math instruction. In 1977-78, reading programs generally received a much higher priority.

Question 2: How Many Participating Students Were Tested? Of the 25,135 students tested, 6,582 were tested in math and 18,553 were tested in reading. The figures represent some duplication of student count; that is, in an unknown number of cases, a student may have been tested in both math and reading. This means the total number of individual students who were tested was between 18,553 and 25,135. The testing patterns followed the participation pattern; that is, it was concentrated in grades 2 through 6. Grade 1 contained a large number of special education students who frequently were not tested.

Instructional programs for the tested students were most often conducted by aides and/or teachers in facilities external to the regular

classroom. Apparently, the aides, teachers, and administrators felt the best atmosphere for learning was outside the regular classroom.

Question 3: What Were the Mean Gain Scores in NCEs? A perusal of Figure 1, page 16, serves to illustrate the differences in the NCE scale and the percentile scale. Crucial to an understanding of the reported gains in Section III and in the Summary is the concept of equalness in the interval size of NCEs and the unequalness in the interval size of percentiles. Near the center of the normal curve distribution (at the 50th NCE and at the 50th percentile), one NCE equals approximately 2 percentile, or five NCEs equals approximately 9.5 percentile. While near the midpoint between 0 and 50 NCEs (near 25 NCEs), one NCE equals approximately one percentile. For example, between 25 NCEs and 35 NCEs, the percentile change is from approximately 12 to 24 -- a total of 10 NCEs for 12 percentile.

The above point about the variability of the relationship between NCEs and percentiles is made to add credibility to the apparently large mean NCE gain scores reported in Section III and the Summary. The reported pretest scores roughly ranged from approximately 10 NCEs to 40 NCEs. Therefore the mean of the reported NCEs was near 25 NCEs. At that level an increase of 5 NCEs amounts to approximately 5 percentile, while an increase of 10 NCEs amounts to approximately 12 percentile. What all this means is that the NCE gains as reported are somewhat near the same numerical gains in percentile, and they are generally gains that should be reasonably expected. However, if the pretest means had been somewhat higher (between 40 and 60 NCEs), one NCE gain on the average would have been equal to approximately two percentile. If any question is raised about the reliability of the data due to the size of the NCE

gain scores, this information should explain why the increases were reasonable.

After considering mean NCE gain scores across all variable levels, instruction in math appeared to be more successful than instruction in reading. Math in the math program only produced a mean NCE gain per student of 7.7, while math as a part of a math-reading program produced a mean NCE gain per student of 7.2. In comparison, the reading program only produced a mean gain of 5.7 NCEs, and the reading as a part of a reading-math program produced a mean gain of 4.9 NCEs.

By interpolation from the range of mean NCE gain scores by grade as presented in the Summary, the math program only was most successful at grade 5 with a mean gain of 11.2 NCEs and was least successful at grade 6 with a mean gain of 5.5 NCEs. When math was a part of a math-reading program the gains were 15.1 NCEs (second grade) and 4.5 NCEs (third grade), highest and lowest respectively.

Using the same interpolative procedure for the reading program, the reading program only had the greatest gain at grade 2 (9.8 NCEs) and the least gain at grade 6 (5.4 NCEs). Reading when a part of a combined reading-math program produced a high gain of 6.5 NCEs at grade 2 and a low gain of 4.3 at grade 6.

By interpolation from the range of mean NCE gain scores by presentation procedure as shown in the Summary, the math program only was most successful when presentation 6 was employed (15.2 NCEs mean gain per student) and least successful when presentation 4 was employed (6.4 NCEs mean gain per student). When math was a part of a math-reading program the gains were 11.2 NCEs (presentation 2) and 4.8 NCEs (presentation 7), highest and lowest respectively.

Using the same interpolative procedure for the reading programs, the reading program only had the greatest gain in presentation 2 (7.4 NCEs) and the least gain in presentation 4 (5.5 NCEs). Reading when a part of a combination reading-math program produced a high gain of 7.8 NCEs in presentation 2 and a low gain of 1.1 in presentation 7.

Through interpolative procedures the grade level which had the highest mean range (gain) was determined. The ranges were established on the basis of mean gains across all presentation procedures. The grades with high and low mean NCE gain scores are shown by subject below.

Math Program Only

Grade 4 . . . 12.2 NCEs
Grade 6 . . . 4.0 NCEs

Math as a Part of a Math-Reading Program

Grade 2 . . . 14.0 NCEs
Grade 6 . . . 5.3 NCEs

Reading Program Only

Grade 7 . . . 9.1 NCEs
Grade 3 . . . 5.6 NCEs

Reading as a Part of Reading-Math Program

Grade 2 . . . 11.1 NCEs
Grade 6 . . . 3.7 NCEs

From the foregoing and the Summary, it is reasonable to conclude that the math program only was most successful at grade 4 with a great deal of success -- but not as much -- at grades 2 and 5. Math as a part of a math-reading program was most successful at grade 2 with a great deal of success -- but not as much -- at grades 6 and 4.

Greatest success for the reading program only was at grade 2 with good, but lesser, success at grades 5 and 4. For reading as a part of a reading-math program, greatest success was at grade 2 with good, but

lesser, success at grades 5 and 4. For reading as a part of a reading-math program, greatest success was at grade 2 with good, but less success at grades 3 and 5.

Overall greatest success in all programs appeared to be in grade 2.

Presentation procedures which were proven to be most successful were as follows:

	Most Successful	Good Success
Math Program Only	6	2 and 5
Math as a Part of Math-Reading Program	2	6 and 5
Reading Program Only	2	5 and 3
Reading as a Part of Reading-Math Program	2	6 and 4

This indicates that presentation procedure 2 was very successful across programs followed by presentation procedures 6 and 5 with good, but less, success.

When considering the grade levels which were most successful across all eight presentation procedures the following shows the outcome:

	Most Successful	Good Success
Math Program Only	4	2 and 5
Math as a Part of Math-Reading Program	2	5 and 4
Reading Program Only	7	2 and 4
Reading as a Part of Reading-Math Program	2	3 and 4

This indicates that grade levels where most success occurred across all presentation were grade 2 and 7, with good, but less, success at grades

5 and 4.

From previously supplied information in this subsection and the Summary, it is reasonable to conclude that the math program only was least successful at grade 6 with the next least success at grade 3. Math as a part of a math-reading program was least successful at grade 3 with the next least success at grade 5.

Least success in the reading program only was at grade 6 with grade 3 the next least successful. For reading as a part of a reading-math program, the least success was found in grade 6 with next least success at grade 4.

Overall least success in all programs appeared to be in grade 6.

Presentation procedures which were proven to be least successful were as follows:

	Least Successful	Next Least
Math Program Only	4	7
Math as a Part of a Math-Reading Program	7	4
Reading Program Only	4	7
Reading as a Part of a Reading-Math Program	7	3

This indicated that presentation procedures 4 and 7 were least successful across programs.

When considering the grade levels which were least successful across all eight presentation procedures the following shows the outcomes:

	Least Successful	Next Least
Math Program Only	6	3
Math as a Part of Math-Reading Program	6	3
Reading Program Only	6	3
Reading as a Part of Reading-Math Program	6	5

This indicates that the grade level where least success occurred across all presentations was grade 6, with next least success at grade 3.

Question 4: What Was the Cost of the Title I Program? The cost data for math and reading programs was collected only for the math program only and the reading program only. That is, no data were collected for combined math and reading programs.

The cost of the math program only was less than the reading program only when the comparison was made across all grades or across all presentation procedures. That cost was about \$43.00 for math and \$64.00 for reading (cost per student per unit gain). Thus, overall math programs were more cost efficient if student gain was the sole criterion.

When presentation procedure across all grades was used as the criterion for analysis of program costs, both the math program only and the reading program only showed little or no consistency in unit cost. Therefore, little in the way of concluding remarks may be made. The reader is referred to the data presented on page 73.

The reader is advised that the highest costs incurred in both the math and reading programs occurred when presentation 8 was used, and the cost was incurred with a relatively small number of students, 32 and 266 respectively. However, in other presentations the n-count was equally small and the cost was much lower. (See Tables 11 on the following

pages: 45-46, 47-48, 50-51, 56-57, 59-60, and 65-66.) Thus, the author can see no clear pattern to costs by presentation.

This phenomenon is probably due to variation in the n-count by presentation procedure across the LEAs; however, insufficient data were available for full verification of this statement.

RECOMMENDATIONS

The first six recommendations deal with exploratory activities which might logically follow from the reported outcomes. Some specific reviews, procedures, and studies are recommended which should help explain the reported outcomes. A second group of recommendations is provided to increase the appropriateness and usability of the collected data (recommendations 7-15). Further, the second group of recommendations when implemented should provide data with a higher degree of reliability and validity. Title I staff expected to make some modifications to the collection instrument and the implementation process after the experiences of the first year. These recommendations should help them make adjustments which will produce better data and ultimately an improved report.

The special talents and expertise of the Technical Assistance Center personnel have been used to the fullest by Title I staff in the past. And, it is anticipated that their recognized abilities will be requested and used again by both the Title I staff and the Division of Research and Evaluation personnel as each recommendation is considered.

1. A review of local testing procedures should be undertaken. The purpose of the review would be to determine any differences between the students tested and those who were not tested in the Title I program.

2. A review of the participant selection procedure should be undertaken. This is suggested as a result of a higher concentration of students at some grade levels.

3. A procedure should be introduced which will provide an accurate count of those students tested in more than one subject. This is needed to ascertain the unduplicated count of tested students.

4. A comparative study of math and reading methodologies with student gain and costs per unit of gain should be undertaken. The purpose would be to determine methodologies by subject that are most cost efficient.

5. A study should be undertaken to determine the reasons students had greater gains at some grades than at other grades. In part, this might involve a study of the related statistical procedures, the scoring procedure, and the tests used.

6. A study of student gain differences by presentation procedures should be initiated. The purpose would be to ascertain if some presentation procedures are truly superior, or is it an interaction with other uncontrolled variables.

7. A thorough investigation of the specific requirements that are to be fulfilled by the impact report should be undertaken by the Title I staff. The purpose of such an investigation is to insure that the information needs of the United States Office of Education and the West Virginia Department of Education are met.

8. The recognized needs should be restated by the Title I staff in the form of questions. Such questions should become the basis for instrument revisions and, subsequently, the basis for analysis of the collected data. This provides assurance that efforts are focused on real,

meaningful questions.

9. To improve the usability of the collected data, the instrument should be carefully critiqued by both the requesting administrators and analyzers. That is, it should be studied carefully by the Title I staff and the Division of Research and Evaluation personnel for potential weaknesses, deficiencies, impracticalities, and so forth which would produce problems in data treatment. Further, the two groups should jointly assure that the data to be collected is appropriated to provide the basic data necessary to answer the stated impact questions.

10. Revisions to the data collection instrument should be made in a manner which would both insure usability and validity and reliability. Without these factors, the data are impossible to adequately analyze, and any resultant report would be seriously questioned by knowledgeable persons. The revisions to the instrument should be made by Division of Research and Evaluation personnel with the concurrence of the Title I staff.

11. After the revisions to the data collection instrument are made, a test of the instrument (an evaluation) should be carried out. Such a test should include two distinct operations: (1) with simulated data and (2) with real data. In both operations, persons responsible for ultimately completing the instrument should be involved. Also, the Title I regional personnel and State staff who advise LEA personnel should be involved in the test. To assure commonality of purpose, all testing of the instrument should be under the direction of the Division of Research and Evaluation personnel. If the personnel responsible for analysis are directly involved in testing the collection instrument, it will assure that the later problems with collected data will be more easily

understood.

12. Final revisions to the data collection instrument, which are made as a result of an evaluation of the instrument, should be made by the Division of Research and Evaluation personnel after consultation with the Title I staff.

13. The system used in testing students and for recording test data, and other data, on the instrument should be jointly reviewed by Title I staff and Division of Research and Evaluation personnel. Changes in that system should be suggested by either group, but they should be approved only by consent of both groups. This is necessary due to the responsibilities of each group. The Title I staff should operationalize and implement the system, and the Division of Research and Evaluation should review the resultant verified data for purposes of analysis and developing the annual impact report.

14. Verification of the collected data should be insured at each level of the aggregation process by specifically appointed persons. Title I regional personnel should be charged with the overall responsibility for the delivery of the requested data in a usable form to the State Title I office.

15. To assure delivery of the completed impact report by the scheduled date (January 1), verified, usable data should be delivered by the Title I staff to the Division of Research and Evaluation by September 1.

APPENDIXES

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APPENDIX A

ALTERNATIVE MODELS FOR TITLE I EVALUATION

There have been three models developed for the evaluation of Title I; the norm-referenced model, the control group model and the special regression model. Within each of the three models is the latitude to use either nationally normed test instruments or criterion-referenced instruments. There are, therefore, six alternative methods that may be used in the evaluation of Title I. Each of the models has certain criteria that must be met, and each of the models should yield valid results if properly implemented. The following model descriptions provide a summary of the various requirements for implementation and the expected results.

MODEL A--Norm-Referenced Design

This model is intended to show the gain in achievement made by the target group relative to the gain that would be expected based on a national sample. It is probably the weakest of the three available models, but is the easiest to implement, particularly with regard to the Federal regulations in 1977-78. A number of variations to the basic requirement for implementation of Model A are possible. Without regard to these variations, four components are necessary. A pretest and posttest must be administered. An instrument different from the pretest must be administered for selection of participants. The tests must be used at a date close to the empirical norming dates of the instruments. In the event that a criterion referenced test or a

locally normed test is used, a nationally normed test must also be administered.

The primary advantages to using Model A is that it requires no testing of non-participating children, little statistical manipulation and does not interfere with selection of participants. It does, however, assume equality between the norming sample and the group from which the local participants are taken.

MODEL B--Control Group Design

This design is the most scientifically acceptable and is expected to provide the most reliable evaluation information. The most important requirement for implementing Model B is the selection of a control group. The control group must be as similar to the treatment group as possible. Ideal selection procedures provide for the random assignments of eligible children to the control and treatment groups. Variations on this procedure should be employed very carefully. The result, however, should be random in effect. In addition to appropriate selection procedures, treatment of control and experimental groups must be the same with the exception of the existence of Title I program activities for the experimental group. All children in both groups must receive a pre and posttest. If a criterion-referenced test or locally normed test is used, a standardized test must also be used in order that national norms may be applied to the evaluation instrument. Although the best model, Model B is very difficult to implement properly and still stay within the Federal regulations (as stated in 1977-78).

MODEL C--Special Regression Design

The regression model is considered a reasonable method of measuring

the effect of Title I. It requires that all children within each grade for which there are Title I participants for each school be pre-tested and posttested. As a result, it involves the testing of a large number of children who are not Title I participants. The premise upon which the regression design is based is that if the regression line for the non-participants is projected over the regression line for the treatment group, the difference in location of the two lines would represent the difference between achievement gain and expected gain for the treatment group. One of the more serious drawbacks of the regression model is the need for a strict delineation between participants and non-participants on the basis of some quantifiable measure.

APPENDIX B

Percentile to Normal Curve Equivalent Conversion Table

%	NCE	%	NCE	%	NCE	%	NCE	%	NCE	%	NCE	%	NCE
1.0	1.0	7.5	19.7	14.0	27.2	20.5	32.6	27.0	37.1	33.5	41.0	40.0	44.7
1.1	1.8	7.6	19.8	14.1	27.3	20.6	32.7	27.1	37.2	33.6	41.1	40.1	44.7
1.2	2.5	7.7	20.0	14.2	27.4	20.7	32.8	27.2	37.2	33.7	41.1	40.2	44.8
1.3	3.1	7.8	20.1	14.3	27.5	20.8	32.9	27.3	37.3	33.8	41.2	40.3	44.8
1.4	3.7	7.9	20.3	14.4	27.6	20.9	32.9	27.4	37.3	33.9	41.3	40.4	44.9
1.5	4.3	8.0	20.4	14.5	27.7	21.0	33.0	27.5	37.4	34.0	41.3	40.5	44.9
1.6	4.8	8.1	20.5	14.6	27.8	21.1	33.1	27.6	37.5	34.1	41.4	40.6	45.0
1.7	5.4	8.2	20.7	14.7	27.9	21.2	33.2	27.7	37.5	34.2	41.4	40.7	45.0
1.8	5.6	8.3	20.8	14.8	28.0	21.3	33.2	27.8	37.6	34.3	41.5	40.8	45.1
1.9	6.3	8.4	21.0	14.9	28.1	21.4	33.3	27.9	37.7	34.4	41.5	40.9	45.2
2.0	6.7	8.5	21.1	15.0	28.2	21.5	33.4	28.0	37.7	34.5	41.6	41.0	45.2
2.1	7.2	8.6	21.2	15.1	28.3	21.6	33.4	28.1	37.8	34.6	41.7	41.1	45.3
2.2	7.6	8.7	21.4	15.2	28.4	21.7	33.5	28.2	37.8	34.7	41.7	41.2	45.3
2.3	8.0	8.8	21.5	15.3	28.4	21.8	33.6	28.3	37.9	34.8	41.8	41.3	45.4
2.4	8.3	8.9	21.6	15.4	28.5	21.9	33.7	28.4	38.0	34.9	41.8	41.4	45.4
2.5	8.7	9.0	21.8	15.5	28.6	22.0	33.7	28.5	38.0	35.0	41.9	41.5	45.5
2.6	9.1	9.1	21.9	15.6	28.7	22.1	33.8	28.6	38.1	35.1	41.9	41.6	45.5
2.7	9.4	9.2	22.0	15.7	28.8	22.2	33.9	28.7	38.2	35.2	42.0	41.7	45.6
2.8	9.7	9.3	22.1	15.8	28.9	22.3	34.0	28.8	38.2	35.3	42.1	41.8	45.6
2.9	10.1	9.4	22.3	15.9	29.0	22.4	34.0	28.9	38.3	35.4	42.1	41.9	45.7
3.0	10.4	9.5	22.4	16.0	29.1	22.5	34.1	29.0	38.3	35.5	42.2	42.0	45.8
3.1	10.7	9.6	22.5	16.1	29.1	22.6	34.2	29.1	38.4	35.6	42.2	42.1	45.8
3.2	11.0	9.7	22.6	16.2	29.2	22.7	34.2	29.2	38.5	35.7	42.3	42.2	45.9
3.3	11.3	9.8	22.8	16.3	29.3	22.8	34.3	29.3	38.5	35.8	42.3	42.3	45.9
3.4	11.6	9.9	22.9	16.4	29.4	22.9	34.4	29.4	38.6	35.9	42.4	42.4	46.0
3.5	11.9	10.0	23.0	16.5	29.5	23.0	34.4	29.5	38.7	36.0	42.5	42.5	46.0
3.6	12.1	10.1	23.1	16.6	29.6	23.1	34.5	29.6	38.7	36.1	42.5	42.6	46.1
3.7	12.4	10.2	23.3	16.7	29.7	23.2	34.6	29.7	38.8	36.2	42.6	42.7	46.1
3.8	12.6	10.3	23.4	16.8	29.7	23.3	34.6	29.8	38.8	36.3	42.6	42.8	46.2
3.9	12.9	10.4	23.5	16.9	29.8	23.4	34.7	29.9	38.9	36.4	42.7	42.9	46.2
4.0	13.1	10.5	23.6	17.0	29.9	23.5	34.8	30.0	39.0	36.5	42.7	43.0	46.3
4.1	13.4	10.6	23.7	17.1	30.0	23.6	34.9	30.1	39.0	36.6	42.8	43.1	46.3
4.2	13.6	10.7	23.8	17.2	30.1	23.7	34.9	30.2	39.1	36.7	42.8	43.2	46.4
4.3	13.8	10.8	23.9	17.3	30.2	23.8	35.0	30.3	39.1	36.8	42.9	43.3	46.4
4.4	14.1	10.9	24.1	17.4	30.2	23.9	35.1	30.4	39.2	36.9	43.0	43.4	46.5
4.5	14.3	11.0	24.2	17.5	30.3	24.0	35.1	30.5	39.3	37.0	43.0	43.5	46.6
4.6	14.5	11.1	24.3	17.6	30.4	24.1	35.2	30.6	39.3	37.1	43.1	43.6	46.6
4.7	14.7	11.2	24.4	17.7	30.5	24.2	35.3	30.7	39.4	37.2	43.1	43.7	46.7
4.8	14.9	11.3	24.5	17.8	30.6	24.3	35.3	30.8	39.4	37.3	43.2	43.8	46.7
4.9	15.1	11.4	24.6	17.9	30.6	24.4	35.4	30.9	39.5	37.4	43.2	43.9	46.8
5.0	15.4	11.5	24.7	18.0	30.7	24.5	35.5	31.0	39.6	37.5	43.3	44.0	46.8
5.1	15.6	11.6	24.8	18.1	30.8	24.6	35.5	31.1	39.6	37.6	43.3	44.1	46.9
5.2	15.8	11.7	24.9	18.2	30.9	24.7	35.6	31.2	39.7	37.7	43.4	44.2	46.9
5.3	16.0	11.8	25.0	18.3	31.0	24.8	35.7	31.3	39.7	37.8	43.5	44.3	47.0
5.4	16.2	11.9	25.1	18.4	31.0	24.9	35.7	31.4	39.8	37.9	43.5	44.4	47.0
5.5	16.3	12.0	25.3	18.5	31.1	25.0	35.8	31.5	39.9	38.0	43.6	44.5	47.1
5.6	16.5	12.1	25.4	18.6	31.2	25.1	35.9	31.6	39.9	38.1	43.6	44.6	47.1
5.7	16.7	12.2	25.5	18.7	31.3	25.2	35.9	31.7	40.0	38.2	43.7	44.7	47.2
5.8	16.9	12.3	25.6	18.8	31.4	25.3	36.0	31.8	40.0	38.3	43.7	44.8	47.2
5.9	17.1	12.4	25.7	18.9	31.4	25.4	36.1	31.9	40.1	38.4	43.8	44.9	47.3
6.0	17.3	12.5	25.8	19.0	31.5	25.5	36.1	32.0	40.1	38.5	43.9	45.0	47.4
6.1	17.4	12.6	25.9	19.1	31.6	25.6	36.2	32.1	40.2	38.6	43.9	45.1	47.4
6.2	17.6	12.7	26.0	19.2	31.7	25.7	36.3	32.2	40.3	38.7	44.0	45.2	47.5
6.3	17.8	12.8	26.1	19.3	31.7	25.8	36.3	32.3	40.3	38.8	44.0	45.3	47.5
6.4	17.9	12.9	26.2	19.4	31.8	25.9	36.4	32.4	40.4	38.9	44.1	45.4	47.6
6.5	18.1	13.0	26.3	19.5	31.9	26.0	36.5	32.5	40.4	39.0	44.1	45.5	47.6
6.6	18.3	13.1	26.4	19.6	32.0	26.1	36.5	32.6	40.5	39.1	44.2	45.6	47.7
6.7	18.4	13.2	26.5	19.7	32.0	26.2	36.6	32.7	40.6	39.2	44.2	45.7	47.7
6.8	18.6	13.3	26.6	19.8	32.1	26.3	36.6	32.8	40.6	39.3	44.3	45.8	47.8
6.9	18.8	13.4	26.7	19.9	32.2	26.4	36.7	32.9	40.7	39.4	44.3	45.9	47.8
7.0	18.9	13.5	26.8	20.0	32.3	26.5	36.8	33.0	40.7	39.5	44.4	46.0	47.9
7.1	19.1	13.6	26.9	20.1	32.3	26.6	36.8	33.1	40.8	39.6	44.4	46.1	47.9
7.2	19.2	13.7	27.0	20.2	32.4	26.7	36.9	33.2	40.9	39.7	44.5	46.2	48.0
7.3	19.4	13.8	27.1	20.3	32.5	26.8	37.0	33.3	40.9	39.8	44.6	46.3	48.0
7.4	19.5	13.9	27.1	20.4	32.6	26.9	37.0	33.4	41.0	39.9	44.6	46.4	48.1

Percentile to Normal Curve Equivalent Conversion Table (continued)

%	NCE	%	NCE	%	NCE	%	NCE	%	NCE	%	NCE	%	NCE	%	NCE
53.0	51.6	59.0	54.8	65.0	58.1	71.0	61.7	77.0	65.6	83.0	70.1	89.0	75.8	95.0	84.6
53.1	51.6	59.1	54.8	65.1	58.2	71.1	61.7	77.1	65.6	83.1	70.2	89.1	75.9	95.1	84.9
53.2	51.7	59.2	54.9	65.2	58.2	71.2	61.8	77.2	65.7	83.2	70.3	89.2	76.1	95.2	85.1
53.3	51.7	59.3	55.0	65.3	58.3	71.3	61.8	77.3	65.8	83.3	70.3	89.3	76.2	95.3	85.3
53.4	51.8	59.4	55.0	65.4	58.3	71.4	61.9	77.4	65.8	83.4	70.4	89.4	76.3	95.4	85.5
53.5	51.8	59.5	55.1	65.5	58.4	71.5	62.0	77.5	65.9	83.5	70.5	89.5	76.4	95.5	85.7
53.6	51.9	59.6	55.1	65.6	58.5	71.6	62.0	77.6	66.0	83.6	70.6	89.6	76.5	95.6	85.9
53.7	52.0	59.7	55.2	65.7	58.5	71.7	62.1	77.7	66.0	83.7	70.7	89.7	76.6	95.7	86.2
53.8	52.0	59.8	55.2	65.8	58.6	71.8	62.2	77.8	66.1	83.8	70.8	89.8	76.7	95.8	86.4
53.9	52.1	59.9	55.3	65.9	58.6	71.9	62.2	77.9	66.2	83.9	70.9	89.9	76.9	95.9	86.6
54.0	52.1	60.0	55.3	66.0	58.7	72.0	62.3	78.0	66.3	84.0	70.9	90.0	77.0	96.0	86.9
54.1	52.2	60.1	55.4	66.1	58.7	72.1	62.3	78.1	66.3	84.1	71.0	90.1	77.1	96.1	87.1
54.2	52.2	60.2	55.4	66.2	58.8	72.2	62.4	78.2	66.4	84.2	71.1	90.2	77.2	96.2	87.4
54.3	52.3	60.3	55.5	66.3	58.9	72.3	62.5	78.3	66.5	84.3	71.2	90.3	77.4	96.3	87.6
54.4	52.3	60.4	55.6	66.4	58.9	72.4	62.5	78.4	66.6	84.4	71.3	90.4	77.5	96.4	87.9
54.5	52.4	60.5	55.6	66.5	59.0	72.5	62.6	78.5	66.6	84.5	71.4	90.5	77.6	96.5	88.1
54.6	52.4	60.6	55.7	66.6	59.0	72.6	62.7	78.6	66.7	84.6	71.5	90.6	77.7	96.6	88.4
54.7	52.5	60.7	55.7	66.7	59.1	72.7	62.7	78.7	66.8	84.7	71.6	90.7	77.9	96.7	88.7
54.8	52.5	60.8	55.8	66.8	59.1	72.8	62.8	78.8	66.8	84.8	71.6	90.8	78.0	96.8	89.0
54.9	52.6	60.9	55.8	66.9	59.2	72.9	62.8	78.9	66.9	84.9	71.7	90.9	78.1	96.9	89.3
55.0	52.6	61.0	55.9	67.0	59.3	73.0	62.9	79.0	67.0	85.0	71.8	91.0	78.2	97.0	89.6
55.1	52.7	61.1	55.9	67.1	59.3	73.1	63.0	79.1	67.1	85.1	71.9	91.1	78.4	97.1	89.9
55.2	52.8	61.2	56.0	67.2	59.4	73.2	63.0	79.2	67.1	85.2	72.0	91.2	78.5	97.2	90.3
55.3	52.8	61.3	56.0	67.3	59.4	73.3	63.1	79.3	67.2	85.3	72.1	91.3	78.6	97.3	90.6
55.4	52.9	61.4	56.1	67.4	59.5	73.4	63.2	79.4	67.3	85.4	72.2	91.4	78.8	97.4	90.9
55.5	52.9	61.5	56.1	67.5	59.6	73.5	63.2	79.5	67.4	85.5	72.3	91.5	78.9	97.5	91.3
55.6	53.0	61.6	56.2	67.6	59.6	73.6	63.3	79.6	67.4	85.6	72.4	91.6	79.0	97.6	91.7
55.7	53.0	61.7	56.3	67.7	59.7	73.7	63.4	79.7	67.5	85.7	72.5	91.7	79.2	97.7	92.0
55.8	53.1	61.8	56.3	67.8	59.7	73.8	63.4	79.8	67.6	85.8	72.6	91.8	79.3	97.8	92.4
55.9	53.1	61.9	56.4	67.9	59.8	73.9	63.5	79.9	67.7	85.9	72.7	91.9	79.5	97.9	92.8
56.0	53.2	62.0	56.4	68.0	59.9	74.0	63.5	80.0	67.7	86.0	72.8	92.0	79.6	98.0	93.3
56.1	53.2	62.1	56.5	68.1	59.9	74.1	63.6	80.1	67.8	86.1	72.9	92.1	79.7	98.1	93.7
56.2	53.3	62.2	56.5	68.2	60.0	74.2	63.7	80.2	67.9	86.2	72.9	92.2	79.9	98.2	94.4
56.3	53.3	62.3	56.6	68.3	60.0	74.3	63.7	80.3	68.0	86.3	73.0	92.3	80.0	98.3	94.6
56.4	53.4	62.4	56.7	68.4	60.1	74.4	63.8	80.4	68.0	86.4	73.1	92.4	80.2	98.4	95.2
56.5	53.4	62.5	56.7	68.5	60.1	74.5	63.9	80.5	68.1	86.5	73.2	92.5	80.3	98.5	95.7
56.6	53.5	62.6	56.8	68.6	60.2	74.6	63.9	80.6	68.2	86.6	73.3	92.6	80.5	98.6	96.3
56.7	53.6	62.7	56.8	68.7	60.3	74.7	64.0	80.7	68.3	86.7	73.4	92.7	80.6	98.7	96.9
56.8	53.6	62.8	56.9	68.8	60.3	74.8	64.1	80.8	68.3	86.8	73.5	92.8	80.8	98.8	97.5
56.9	53.7	62.9	56.9	68.9	60.4	74.9	64.1	80.9	68.4	86.9	73.6	92.9	80.9	98.9	98.2
57.0	53.7	63.0	57.0	69.0	60.4	75.0	64.2	81.0	68.5	87.0	73.7	93.0	81.1	99.0	99.0
57.1	53.8	63.1	57.0	69.1	60.5	75.1	64.3	81.1	68.6	87.1	73.8	93.1	81.2		
57.2	53.8	63.2	57.1	69.2	60.6	75.2	64.3	81.2	68.6	87.2	73.9	93.2	81.4		
57.3	53.9	63.3	57.2	69.3	60.6	75.3	64.4	81.3	68.7	87.3	74.0	93.3	81.6		
57.4	53.9	63.4	57.2	69.4	60.7	75.4	64.5	81.4	68.8	87.4	74.1	93.4	81.7		
57.5	54.0	63.5	57.3	69.5	60.7	75.5	64.5	81.5	68.9	87.5	74.2	93.5	81.9		
57.6	54.0	63.6	57.3	69.6	60.8	75.6	64.6	81.6	69.0	87.6	74.3	93.6	82.1		
57.7	54.1	63.7	57.4	69.7	60.9	75.7	64.7	81.7	69.0	87.7	74.4	93.7	82.2		
57.8	54.1	63.8	57.4	69.8	60.9	75.8	64.7	81.8	69.1	87.8	74.5	93.8	82.4		
57.9	54.2	63.9	57.5	69.9	61.0	75.9	64.8	81.9	69.2	87.9	74.6	93.9	82.6		
58.0	54.2	64.0	57.5	70.0	61.0	76.0	64.9	82.0	69.3	88.0	74.7	94.0	82.7		
58.1	54.3	64.1	57.6	70.1	61.1	76.1	64.9	82.1	69.4	88.1	74.9	94.1	82.9		
58.2	54.4	64.2	57.7	70.2	61.2	76.2	65.0	82.2	69.4	88.2	75.0	94.2	83.1		
58.3	54.4	64.3	57.7	70.3	61.2	76.3	65.1	82.3	69.5	88.3	75.1	94.3	83.3		
58.4	54.5	64.4	57.8	70.4	61.3	76.4	65.1	82.4	69.6	88.4	75.2	94.4	83.5		
58.5	54.5	64.5	57.8	70.5	61.3	76.5	65.2	82.5	69.7	88.5	75.3	94.5	83.7		
58.6	54.6	64.6	57.9	70.6	61.4	76.6	65.3	82.6	69.8	88.6	75.4	94.6	83.8		
58.7	54.6	64.7	57.9	70.7	61.5	76.7	65.4	82.7	69.8	88.7	75.5	94.7	84.0		
58.8	54.7	64.8	58.0	70.8	61.5	76.8	65.4	82.8	69.9	88.8	75.6	94.8	84.2		
58.9	54.7	64.9	58.1	70.9	61.6	76.9	65.5	82.9	70.0	88.9	75.7	94.9	84.4		

APPENDIX C

LOCAL EDUCATION AGENCIES USING THE NEW EVALUATION
INSTRUMENT FOR REPORTING ON PROGRAM IMPACT

Barbour	Mineral
Berkeley	Mingo
Boone	Monongalia
Braxton	Monroe
Brook	Morgan
Cabell	Ohio
Calhoun	Pendleton
Doddridge	Pleasants
Gilmer	Putnam
Grant	Raleigh
Hampshire	Ritchie
Hancock	Roane
Hardy	Summers
Harrison	Taylor
Jackson	Tucker
Jefferson	Tyler
Kanawha	Upshur
Lewis	Wayne
Lincoln	Webster
Logan	Wetzel
Marshall	Wirt
Mason	Wyoming
Mercer	